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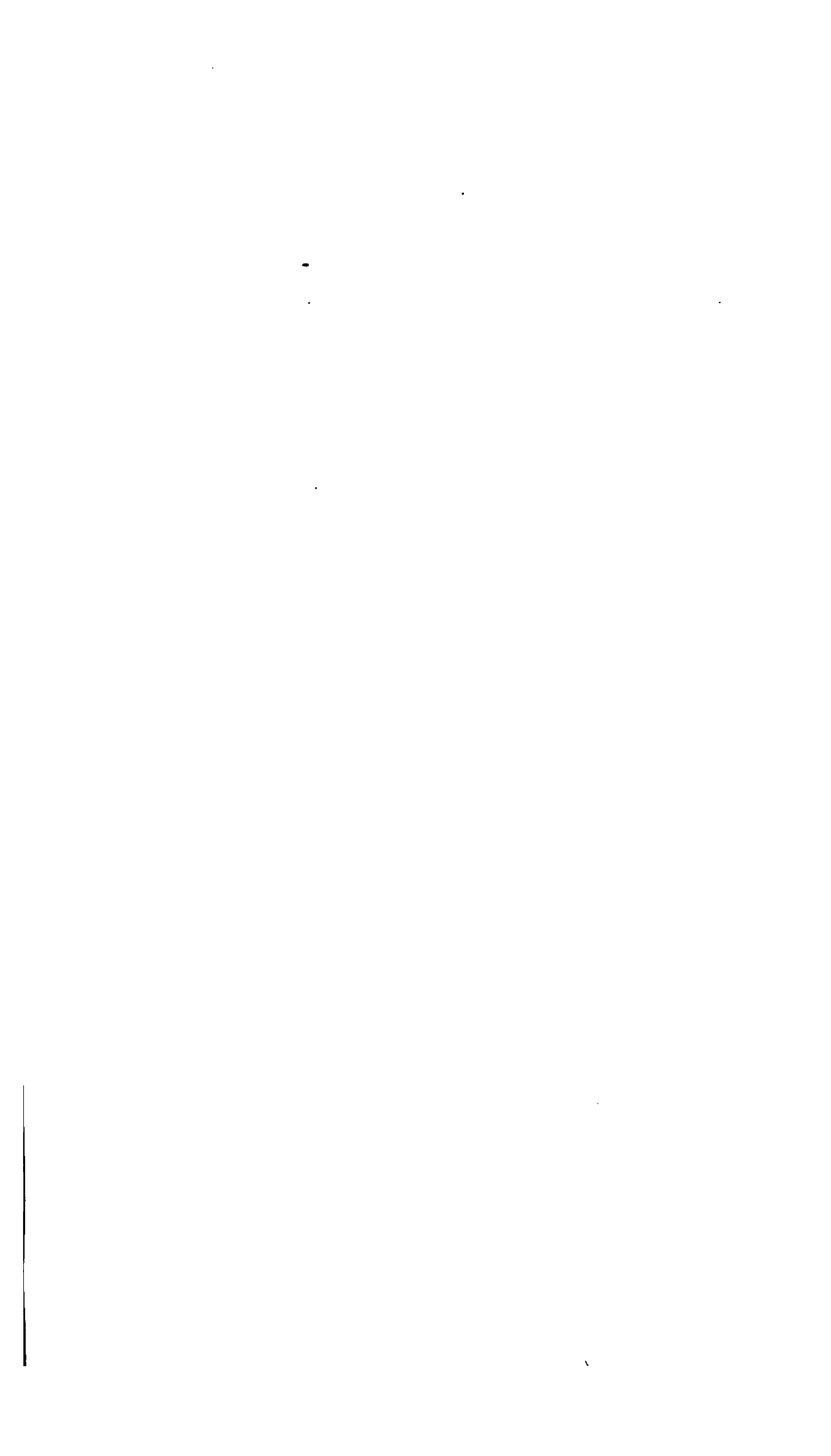
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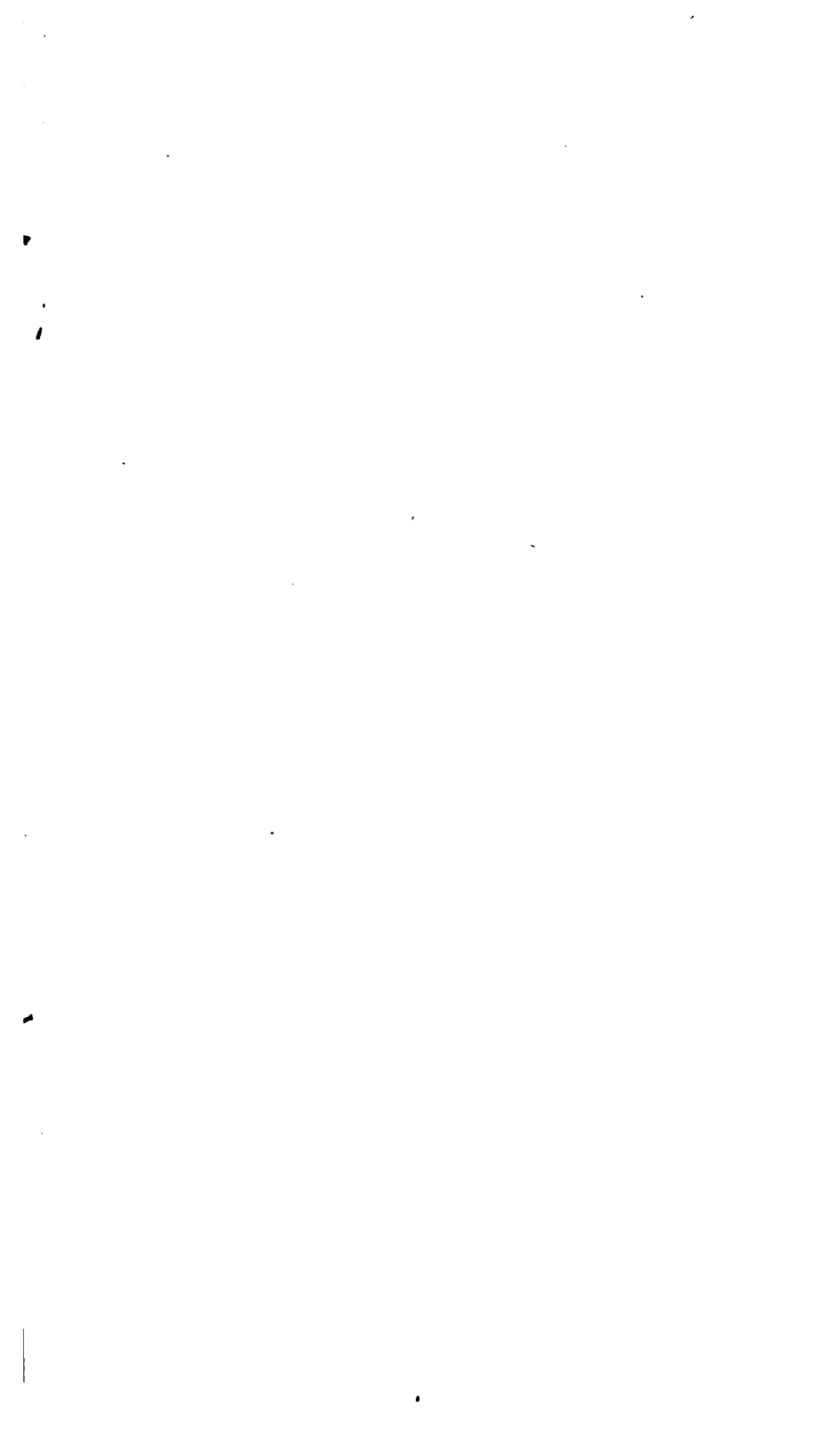
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E. Davy

STATISTICAL SURVEY

OF THE

COUNTY OF ANTRIM,

WITH

OBSERVATIONS

ON THE

MEANS OF IMPROVEMENT;

DRAWN UP FOR THE CONSIDERATION, AND BY DIRECTION

OF THE

DUBLIN SOCIETY.

BY THE

REV. JOHN DUBOURDIEU,

RECTOR OF ANNAHILT.

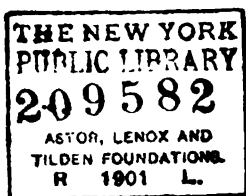
*Omnium rerum, ex quibus aliquid acquiritur, nihil est agricultura
paciens, nihil uberius, nihil homine libero dignius.*

CICERO TO HIS SON MARCUS,

DUBLIN:

**PRINTED BY GRAISBERRY AND CAMPBELL, 10, BACK-LANE,
PRINTERS TO THE DUBLIN SOCIETY.**

1812.



TO THE READER.

This REPORT is at present printed and circulated for the purpose merely of procuring further information, respecting the state and husbandry of this district, and of enabling every one interested in the welfare of this country to examine it fully, and contribute his mite to its improvement.

The Society do not deem themselves pledged to any opinion given by the Author of this Survey; and they desire, that nothing contained in it be considered as their sentiments; they have only published it, as the Report of the gentleman, whose name is affixed, and they publish it for the comments and observations of all persons, which they entreat to be given freely and without reserve.

It is therefore requested, that the observations on reading this work may be returned to the Dublin Society as soon as may be convenient, and which will meet with the fullest attention in a future edition.

NEW YORK
JUL 18 1891
YERGEN

TO
GENERAL VALLANCEY, &c. &c.

SIR,

IN the prosecution of this, and of a former work of a similar nature, having been so often a witness of the ability and unremitting attention, with which the office of Vice-President of the Dublin Society has been discharged by you, and, consequently, knowing how much every object, which comes before the Society, is furthered by that attention and ability, I presume to add my tribute to the public voice, and request that you will accept of this, as an unfeigned testimony of esteem and respect, from,

SIR,

Your obedient and

Obliged humble Servant,

JOHN DUBOURDIEU.

Annahilt,

November 1st, 1811.



PREFACE.

THE obtaining and arranging of the materials contained in these sheets has been attended with a considerable degree of labour, and not a little anxiety; from the various subjects embraced, in many particulars there must be deficiencies; but still, so far as they extend, it is hoped, that no unfaithful picture is presented of a county so interesting to the agriculturist, to the political arithmetician, and to the geologist. Though our agriculture is far from being perfect, it must be admitted that, in general, it is much above par; in some parts approaching to excellence, and in all progressive. If to the potatoe fallow, so generally understood in the best farmed districts, and to which so much is owed, the cultivation
of

of green crops would be added; and if the advantages of soiling were perfectly known and practised, so that an end might be put to exhausting the ground by repeated crops of grain, so great a point would be gained, that little would be wanting to render our system nearly equal to the best. That, in the end, improvements will be adopted, particularly in some districts, there is little doubt, from the example shewn by so many gentlemen, and from the sagacity of the immediate occupiers, which will naturally lead them to fall into every practice, which gives a prospect of advantage. The improvement of mountains and bogs, which bear so great a proportion to our surface, has been strongly recommended (wherever they will admit of it) to the attention of the proprietors; whatever is gained from them, is so much added to the public stock.

The progress of population and manufactures has been shewn, as far as circumstances would allow of, and data were obtained. The population of Ireland, being more dispersed in the country parts, makes certainly that subject

ject more difficult than in England, where the people are more confined to towns and villages. The account of the progress of our manufactures is from the best sources, that could be procured, and may be presumed to be tolerably accurate.

If it should be thought, that too great a portion of the mineralogical part of the work has been devoted to the basalt, it will, at the same time, (it is hoped) be recollected, that in itself it has a peculiar claim to notice, from the interest it has every where excited, and from its being so particularly an Antrim subject.

Upon antiquities more might have been said, but the necessity of treating at large upon other matters, more applicable to the purposes of this work, precluded the entering more minutely into them.

Many other gentlemen, besides General Vallancey, have also claims upon my acknowledgements, whom I have mentioned in the course of the work; but to those, whose names follow, I feel myself bound to be particular in my thanks.

To

To Mr. Joy* I hold myself much indebted, not only for much of the valuable information afforded by him on the settlement of this country in the reign of James the first, but for much on a variety of other subjects; and also for what he has been the means of procuring for me, particularly on the cotton trade, from Messrs. Mc. Cracken, and, on the state of the shipping interest in Belfast, from Mr. Ritchie. To the Rev. Robert Trail, of Mount Druid, I owe the account of the Ballycastle collieries, and many communications concerning the northern baronies; the constables return of stock, &c. &c. in that district, and the state of his parish of Ballintoy, a most curious and valuable document; on every occasion, when he was applied to, I have reason to acknowledge the readiness, with which he furnished information, the more valuable from the known accuracy of the contributor.

To the Rev. Richard Dobbs I owe the inspection of many curious papers collected by his father, the late Dean Dobbs, from which
the

* Late of the Lodge—now of Belfast.

the reader will find extracts in the account of Carrickfergus, and in other places.

Mr. Templeton's proofs of the existence of the char (*salmo Alpinus*) in Lough Neagh must prove an interesting piece in the natural history of that lake, and will be as gratefully received by the public as by the writer, who owes to the same gentleman much information on other subjects.

The Rev. G. V. Sampson's Survey of Londonderry has several times been quoted, but not so often as it might have been done with advantage.

Though the drawings, furnished by the Rev. Holt Waring, are mentioned in the body of the work, it must be observed, that they form altogether the most lively representation of our northern coast, which has yet appeared, the true character of it having been most happily seized by the pencil of this ingenious gentleman. The engraving does credit to Mr. Ford the artist.

Three appendixes are by Doctor Richardson; the first on ochre and zeolite, the second on the basaltic area, and the third an

itinerary, descriptive of the most interesting features assumed by the basalt in different points. It is almost unnecessary to observe, that these papers, coming from the pen of Dr. Richardson, must contain matter both valuable and curious.

To Mr. Corry, of the Linen Office, I am much obliged for procuring the accounts of the quantity of linen exported from 1780 to the present year.

The Rev. Doctor Lanigan, librarian to the Dublin Society, I most particularly thank for the care, which he has taken in correcting the press, and in preventing the work, in a great degree, from acquiring any addition to its original defects, which, from the intricacy of the manuscript in some places, was most difficult to avoid. To Dr. Lanigan's critical knowledge and persevering correctness the works, published under the auspices of the Dublin Society, are much indebted.

SUGGESTIONS OF INQUIRY

FOR GENTLEMEN, WHO SHALL UNDERTAKE THE FORMING

OF

AGRICULTURAL SURVEYS.

GEOGRAPHICAL STATE AND CIRCUMSTANCES,

Situation and extent,

Divisions,

Climate,

Soil and surface,

Minerals,

Water.

AGRICULTURE.

Mode of culture,

Extent of it, and of each species of grain sowed,

Course of crops,

Use of oxen—how harnessed,

Nature and use of implements of husbandry,

Markets for grain,

Use of green food in winter.

PASTURE.

Nature of it,

Breed of cattle—how far improved,

Bread

Breed of cattle—how far capable of further improvement,
Markets or fairs for them,
General prices,
Modes of feeding—how far housed in winter,
Natural grasses,
Artificial grasses,
Mode of hay-making,
Dairies—their produce,
Prices of hides, tallow, wool, and quantity sold.

FARMS.

Their size,
Farm houses and offices,
Mode of repairing them, whether by landlord or tenant,
Nature of tenures,
General state of leases,
_____ of particular clauses therein,
Taxes or cesses paid by tenants,
Proportion of working horses or bullocks to the size of farms,
General size of fields, or enclosures,
Nature of fences,
Mode of hedge-rows, and keeping hedges,
Mode of draining,
Nature of manures.

GENERAL SUBJECTS.

Population,
Number and size of villages and towns,
Habitation,

OF INQUIRY,

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Habitation, fuel, food, and cloathing of the lower rank—
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Prices of wages, labour, and provisions,

State of tithe, its general amount on each article—what
articles are exempt, and what charged by modus,

Use of beer and spirits—whether either or which is increas-
ing,

State of roads, bridges, &c.

— of navigations and navigable rivers,

— of fisheries,

— of education, schools, and charitable institutions,

— of absentee and resident proprietors,

— of circulation of money or paper,

— of farming or agricultural societies,

— of manufactures, whether increasing,

— of encouragement to them, and the peculiar aptness,
of the situation for their extension,

— of mills of every kind,

— of plantations and planting,

— of the effects of the encouragement heretofore given
to them by the Society, particularised in the list annexed,

— of any improvements, which may occur for further
encouragement, and particularly for the preservation
of the trees, when planted,

— of nurseries within the county, and extent of sales,

Price of timber, and state of it, in the county,

Quantity of bog and waste ground,

Possibility and means of improving it,

Obstacles to it, and best means of removing them,

Habits of industry, or want of industry, among the people,

The

The use of the English language, whether general, or how far increasing,

Account of towers, castles, monasteries, ancient buildings, or places remarkable for any historical event,

Churches—resident clergy, glebes and glebe houses,

Whether the county has been actually surveyed, when, and whether the survey is published,

Weights and measures, liquid or dry—in what instances assigned for measures—or *vice versa*,

The weight or measure, by which grain, flour, potatoes, butter, &c. are sold.

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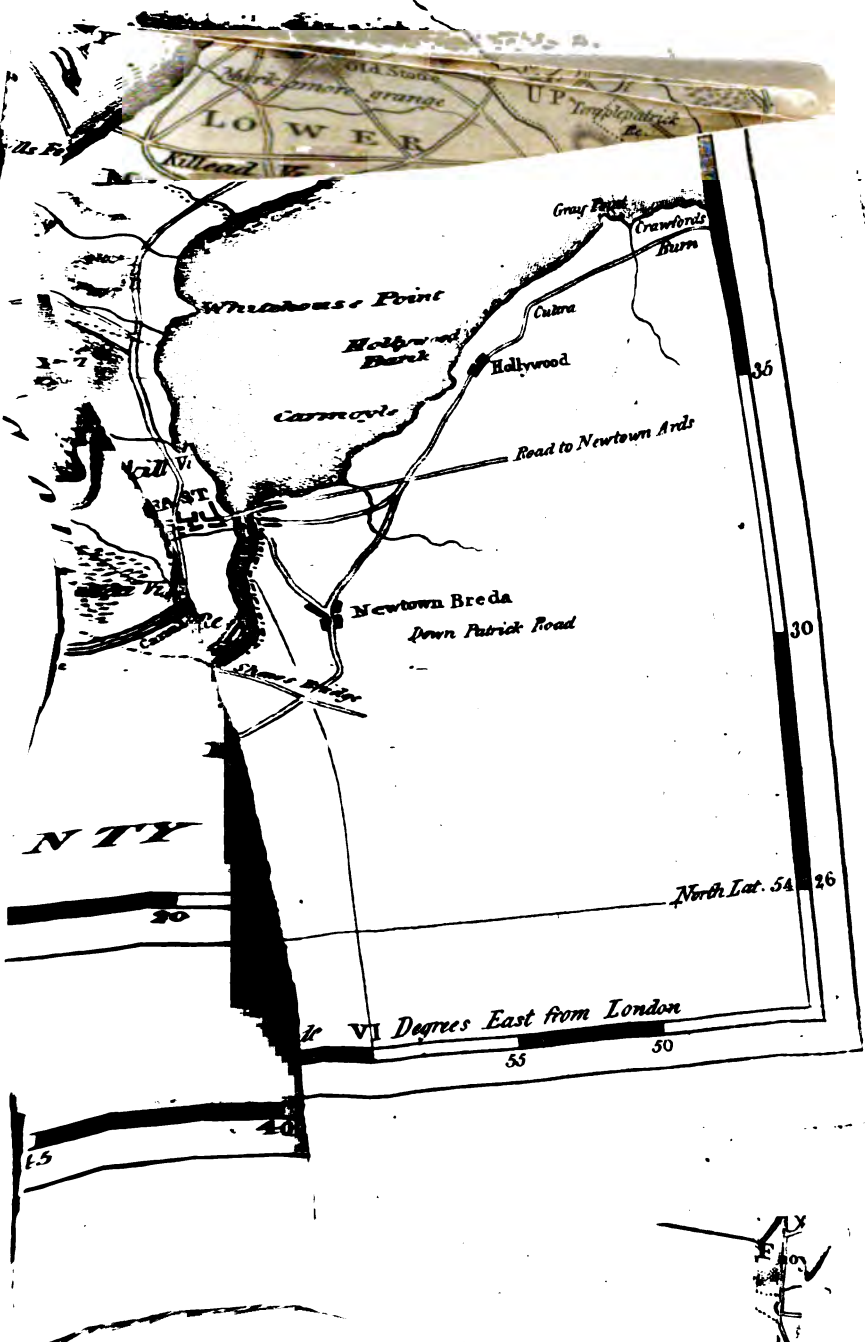


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STATISTICAL SURVEY

OF THE

COUNTY OF ANTRIM.

CHAP. I.

GEOGRAPHICAL STATE AND CIRCUMSTANCES.

SECT. 1. *Situation and Extent.*

THE county of Antrim is a maritime county, which presents a considerable line of coast to the northern ocean, and to the Irish channel; by the former it is bounded to the north; by the latter to the east; Carrickfergus bay and the river Lagan form its limits to the south-east, dividing it from the county of Down as far to the south as Spencer's bridge. To the south-west it has the same county, which running to a point meets Lough Neagh at Shanport. To the west it has the winding shores of Lough Neagh, and Lough Beg, until it meets

the river Bann, issuing from the latter; from thence this river, taking a northerly course inclining to the west, separates Antrim from Londonderry, and with the Liberties of Coleraine compleats its circuit.

Extent.

THE county of Antrim lies between $54^{\circ}-26'$ and $55^{\circ}-12'-16''$ north latitude; its greatest length is from Bengore head north, to Spener's bridge south, and is according to Mr. Lendrick's map, $41\frac{3}{4}$ Irish miles. Its greatest breadth from the Gobbins east, to Island Reagh Toome west, is about 24 miles. The superficial contents, from the same authority, are 420,999 Irish acres.

Divisions, Civil and Ecclesiastical.

This county contains eight baronies; their contents in Irish acres are as follow:

Barony of Dunluce	56320
Carey -	45360
Killconway	38569
Glenarm	50240
Toome -	48160
Antrim -	67520
Belfast -	65920
Masserene	48910

According

OF THE COUNTY OF ANTRIM. 3

According to these divisions all taxes upon the county at large are apportioned.

In the ancient divisions of Ireland that part of the county of Antrim towards the south and south-west was denominated Dalaradia; the western and the north-western parts were named Dalrieda; and the name of the whole is said to have been Andruim * or Endruim, that is "The Habitation upon the Waters"; from that word without much etymological violence the name of Antrim might have been derived. Prior, however, to the present baronial divisions, the different districts, though not very accurately defined, were 1st, North Clандoboy; 2nd, Bryan Currough's country; 3d, the Glynnnes; and 4th, the Rout or Reuta. North Clандoboy, so called to distinguish it from South Clандeboy, a territory in the county of Down, extended from Carrickfergus bay, and the river Lagan, west to Lough Neagh; consequently it contained the baronies of Belfast, Masserene, and Antrim. Bryan Currough's country was a part of North Clандeboy, won from it by the Scots of the sept of Clандonnell. † The Glynnnes, so called from

* Harris's Ware—Collectanea. On inspecting the map it will be seen that this county is nearly surrounded by water.

† Mac Donnell.

4 STATISTICAL SURVEY

from the form of the grounds, extended from Oldfleet, * to near Ballycastle, backed by the mountains to the west, and therefore contained the barony of Glenarm and part of Carey. The Route lay between the river Bann to the west, Clandeboy, south-east, the Glynnnes to the east, and the sea to the north; comprehending nearly the remainder of the county. This tract, in Queen Elizabeth's reign, was sometimes also named Mac Sorley Boy's country. Island Magee appears to have been considered as a separate portion; contributing to Clandeboy, and depending upon the castle of Carrickfergus. †

The final arrangement of the baronies was by Sir John Perrot A. D. 1584; but, notwithstanding this settlement, it was a considerable time before it was completely acknowledged and acted upon; for, in the grand inquisition of the county of Down, held in the year 1622, Malone and Kiltulagh are said to lie in the county of Down.

The minor civil divisions are half baronies, constablewicks, and townlands. This last division must have been of a very early date; for, the names are
nearly

* Larne.

† Manuscript Description of Ireland in the collection of the late Rev. Richard Dobbs, dean of Connor.

nearly all Irish and expressive of the qualities of the land, or descriptive of some circumstance that relates to them. These townlands cannot be the same as those mentioned by Sir James Ware, as affording pasture for 300 cows, which being divided into four herds, none of the herds could see each other. There is another division of land mentioned in the patent of Charles the 1st to the Antrim family, viz. Touagh; this has been supposed a district similar to our barony; but that could not be the case, for the Glynnnes are here said to contain seven Touaghs; but it has already been showed, that the Glynnnes only contain the barony of Glenarm and part of Carey. Many of the names still remain, and give a kind of vague denomination to parts of the country, but they have no exact definition as to any county regulations. Cinament, another ancient denomination, is said to be derived from an Irish word which Ware calls Cine, but which I am informed is more properly spelled Cineim, a family; this appears to have been the land appropriated to the residence of a family, as the signification of the word implies, and in modern language might be termed a demesne. Ploughlands were instituted in the reign of Philip and Mary; according to them certain taxes were paid. They were rated at 100 acres; this division is now quite laid aside.

Ecclesiastical

Ecclesiastical State of the county of Antrim.

THE bishopric of Connor comprehends the whole county of Antrim, (and also the liberties of Coleraine) except the parish of Aghalee, or Soldiers-town, in the barony of Masserene, which is in the diocese of Dromore, and the parish or grange of Ballicullen, which belongs to the diocese of Derry.

The dignitaries are the bishop, dean, archdeacon, chancellor, treasurer, precentor, and four prebends. The dean is appointed by the crown and holds the rectories of Island Magee, Carrickfergus, Larne, Inver, Raloo, and Moylusk. The archdeacon is appointed by the bishop, and holds the rectorial tithes of Ardmoy, Billy, Donegore, Killbride, and Ballyclug.

The chancellor is named by the bishop, and holds the rectorial tithes of Glenarm, with Teckmacreevan, Ramoan, Culfaghtrin, Loughgule, Ballywillan, and Ballyrashane.

The treasurer is appointed by the bishop, and holds the rectories of Ballyaghran and Ardclinnis.

The precentor holds the rectory of Ballymoney together with the rectorial tythes of Dunluce, and is also appointed by the bishop.

1st, The prebend of Connor holds the vicarage of Connor with Killagan, which is a rectory, but

OF THE COUNTY OF ANTRIM. 7

no tithe has been paid for some time. 2d, The prebend of Rathsharkin holds the chief parts of the rectories of Rathsharkin, Finvoy, Killraghts, and Kildallock. 3d, The prebend of Carncastle holds the rectories of Carncastle, St. Caning, Killwalter, Rashee, (i. e. Ballycasten and Ballycor) and Derryheighan. 4th, The prebend of Killroot holds the vicarages of Templecurran and Ballynure. The prebends are appointed by the bishop.

LIST

LIST of the ECCLESIASTICAL BENEFICES in the Diocese of CONNOR, with the Names of the Patrons, and of the Proprietors of the Rectorial tithes, where they do not go with the Incumbent.

Benefices.		Barony.	Patrons.	Proprietors of Rectorial Tithes
Ahagallon	- - - }	Massereene	Marquis of Hertford	has rectorial tithes.
Aghalee	- - - }	Toome	The Crown	
Ahoghill	- - - }	Antrim	Marquis of Donegall	has rectorial tithes.
Antrim	- - - }	Glenarm	The bishop	
Ardclinnis	- - - }	Carey	The bishop	Archdeacon, rectorial tithes.
Ardmoy	- - - }	Dunluce	The bishop	
Ballymoney	- - - }	Massereene	Marquis of Hertford	has rectorial tithes.
Ballinderry	- - - }	Carey	The bishop	
Ballintoy	- - - }	Belfast	The bishop	
Ballynure	- - - }	Antrim	The bishop	Archdeacon.
Ballyclug	- - - }	Toome	Curacy	Lord Mount Cashell.
Ballymena	- - - }			

Benefices.

OF THE COUNTY OF ANTRIM.

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<i>Benefices.</i>	<i>Barony.</i>	<i>Patrons.</i>	<i>Proprietors of Rectorial Tithes.</i>
Ballyhinny	Belfast	Marquis of Donegall	has rectorial tithes.
Ballyrashane	Dunluce	The bishop	Chancellor has rectorial tithes.
Ballywillan	Dunluce	The bishop	Ditto
Billy	Dunluce	The bishop	{ Archdeacon has rectorial tithes.
Camlent	Masserene	Marquis of Hertford	has rectorial tithes.
Carmoney	Belfast	Marquis of Donegall	has rectorial tithes.
Carncastle	Glenarm	The bishop	
Connor	Antrim	The bishop	{ Marquis of Donegall has rectorial tithes.
Culfeightrin	Carey	The bishop	Chancellor has rectorial tithes
Derryaghy	Belfast	The primate	who has rectorial tithes.
Derrykeighan	Dunluce	The bishop	

Benefices.

<i>Benefices.</i>	<i>Barony.</i>	<i>Patrons.</i>	<i>Proprietors of Rectorial Tithes.</i>
Donegor	Antrim	The bishop	{ Archdeacon has rectorial tithes.
Drumaul	Toome	Marquis of Donegall	who has rectorial tithes.
Dunaghy	Kilconway	The bishop	who has rectorial tithes.
Duneane	Toome	Marquis of Donegall	who has rectorial tithes.
Dunluce	Dunluce	The bishop	Precentor has rectorial tithes.
Finvoy	Kilconway	The bishop	who has rectorial tithes.
Glenavy	Masserene	Marquis of Hertford	who has rectorial tithes.
Glyn	Belfast	Marquis of Donegall	Dean has rectorial tithes.
Inver of Larne	Belfast	Perpetual cure	Part of the Deanery.
Island Magee	Belfast	The Crown	{ Archdeacon has rectorial tithes.
Kilbride	Antrim	The bishop	

Benefices.

OF THE COUNTY OF ANTRIM.

11

<i>Benefices.</i>	<i>Barony.</i>	<i>Patrons.</i>	<i>Proprietors of Rectorial Tithes.</i>
Kilbhead	-	Earl of Masserene	{ Earl of Masserene, Lady Langford, Mr. Moore, Mr. Henry, &c.
Killraghts	-	Dunluce	
Killroot	-	Belfast	{ Dean Swift held this as part of the prebend.
Killwalter	-	Glenarm	
Lambeg	-	Belfast	{ A curacy. The bishop owns rectorial tithes, but the curate receives them.
Layde	-	Glenarm	
Lisburn	-	Masserene	
Loughgule	-	Dunluce	{ Chancellor has rectorial tithes.

Benefices.

<i>Benefices.</i>	<i>Barony.</i>	<i>Patrons.</i>	<i>Proprietors of Rectorial Tithes.</i>
Magheragall -	Masserene -	The bishop -	{ Marquis of Hertford has rectorial tithes.
Maherameak -	Masserene -	Marquis of Hertford	who has rectorial tithes.
Moylask -	Belfast -	The Crown -	Part of deanery.
Racavan -	Antrim -	Marquis of Donegall	who has rectorial tithes.
Ramoon -	Carey -	The bishop -	Chancellor has rectorial tithes
Rasliarkin -	Kilconway -	The bishop -	
Rashee, with Bally- eston and Bally- cor, -	Antrim -	The bishop -	
Rathlin Island, or, Ragharee, -	Carey -	The bishop -	
St. Caning -	Glenarm -	The bishop -	

Benefices.

<i>Benefices.</i>	<i>Barony.</i>	<i>Patrons.</i>	<i>Proprietors of Rectorial Tithes.</i>
Shankel, or, Belfast	Belfast -	Marquis of Donegall	who has rectorial tithes.
Skerry -	Antrim -	Marquis of Donegall	{ This parish was called <i>Vera deserta</i> .
Templecorran -	Glenarm -	The bishop -	
Teekmacreeveen -	Glenarm -	The bishop -	Chancellor has rectorial tithes. who has rectorial tithes.
Tullyrusk -	Masserene -	Marquis of Hertford	
Templepatrick -	Belfast -	Marquis of Donegall	
Portglenone Chapel goes with Ahoghill }	Toome -	The Crown -	
Ballycastle Chapel,	Carey -	Boyd family	

In

In speaking of the ecclesiastical state of the diocese of Connor, a denomination or division of land, known by the name of Grange, must not be omitted; of these there are seven in this county, one of them in the see of Derry; their names and situation are as follow :

Muckamore	Grange,	Masserene.
Nilteen	ditto,	Antrim.
Doagh	ditto,	ditto.
† Shilvoden	ditto,	Toome.
Balliscullen	ditto,	ditto.
Killagan	ditto,	Dunluce.
Drumtullogh	ditto,	ditto.

These lands are in general extra-parochial, and, except in one or two instances, do not pay tithe. From the word *grange*, which signifies a farm with a house at a distance from others, it should seem that they have been formerly appendages to some of the monastic possessions. Muckamore grange, as an example, was very conveniently situated for the great religious establishment of the same name.

In placing the parishes, I have assigned them
to

† Belonged to Muckamore.

to those baronies, in which the greater proportion of them lie; as many of them extend into more than one; indeed the ecclesiastical distribution of Ireland seems to have been prior to, and in a great measure independent of its civil divisions, which is strongly proved by the different dioceses and parishes running into different counties and baronies.

The see of Down was united to that of Connor by Pope Eugenius IV. Henry VI. approved of this union, as appears by his diploma, given in the sixteenth year of his reign, 1438. Nevertheless, John, to whom it was given, had a great contention with Thomas Pollard about the rights of the bishoprick of Down, both accounting themselves bishops. Pollard gave up the strife in 1449. John died in 1451.

In the same year he was succeeded by Robert Rochfort.

In 1456, Thomas succeeded.

In 1469, Thaddeus.

In 1486, Tiberius; who succeeded him is not known.

In 1541, Eugenius Maginis, after submission, and oaths of fidelity, was restored to the temporalities by Henry VIII. In his time the priory of St. Patrick, at Down, was suppressed. He sat in
the

the Parliament held in Dublin, 12th January, 1551, second of Elizabeth.

In 1568, John Merriman, an Englishman, was appointed.

In 1573, Hugo Allen.

In 1593, Edward Edgeworth.

In 1596, John Charden.

In 1602, Robert Humpotøn, who died at Killroot, in 1606.

In 1611, John Todd, Dean of Cashel, formerly a Jesuit, being prosecuted, he resigned, and, not long after, died in London, in prison, as it is said, from poison, which he kept prepared for himself.

In 1612, Jacob Dundas.

In 1613, Robert Echlin.

In 1635, Henry Leslie.

In 1660, Jeremiah Taylor.

A small island in Lough * Beg, or Portmore lough, and parish of Ballinderry, which contains some ruined walls, just under the garden of Portmore, is shewn; where, in a sort of summer-house, he is said to have written some of his most important

* This is not the same lough, from which the Bann issues. *Beg* means *little*, and is used to distinguish it from Lough Neagh.

important tracts; and in that neighbourhood his memory is still held in veneration.

The work, which he finished at Portmore, was the *Ductor Dubitantium*, or, Rule of Conscience, as it is dated from thence.

His *Holy Living and Dying*, was written during his retirement in Carmarthenshire, in the time of the Protectorate. He left that situation, where he had experienced great domestic misfortunes, and went to reside in London, where he officiated to a congregation of Loyalists. At this time he formed an acquaintance with Edward Lord Conway, who appears to have been so much pleased with his manners and conversation, that he solicited him to accompany him to his seat at Portmore, in the county of Antrim, where he continued until the Restoration. It was during his residence there, that he wrote the work above-mentioned.

In 1660, he was recompensed for his steady attachment to the royal cause, and had the good fortune to be rewarded in a manner suitable to his fidelity and his virtues; for in that year he was promoted to the sees of Down and Connor, to which was annexed the administration of the bishoprick of Dromore. Previous to this he had been honoured with a seat in the privy council of Ireland, and the University of Dublin conferred

on him the office of their Vice-Chancellor. This good bishop did not long enjoy his elevation; he died in August 1667, at Lisnagarvy (Lisburn).

Bishops of Down and Connor.

Roger Boyle,	1667
Thomas Hacket,	1672
Samuel Foley,	1694
Edward Walkington,	1698
Edward Smyth,	1699
Francis Hutchinson,	1721
Carus Reynolds,	1739
John Ryder,	1744
John Whitcome,	1752
Arthur Smyth,	1753
James Trail,	1766
William Dickson,	1782
Nathaniel Alexander,	1804

It is remarkable, that neither Sir James Ware, nor his continuator, Walter Harris, should have heard of the Letters Patent granted by King James I. dated July 20, in the seventh year of his reign, by which that monarch founds and creates three cathedral churches in the province of Ulster, of the bishops of Down, Connor, and Dromore,

Dromore, viz. first, the cathedral church of St. Patrick, at Down, in the county of Down, to be thenceforth called the church of the Holy Trinity, of Down; second, that at Connor, to be called the church of the Holy Saviour, of Connor, in the county of Antrim; and third, that of Dromore, to be thenceforth called the church of Christ the Redeemer, of Dromore, in the county of Down; and that each of these churches is to consist of a dean, and four dignitaries, besides certain prebendaries to each. † The union of bishoprics, and other ecclesiastical divisions, are always the same in the Established and Catholic churches. The Protestant Dissenters do not divide their parishes according to *land*, but according to the *people* who find it convenient to attend worship at a particular place. †

Before I take leave of ecclesiastical matters, it may not be amiss to say something upon the management of tithes in this county. The rectorial tithes of near twenty parishes are in the hands of lay proprietors, who, in many instances, are also the landlords. In that case, the tithe is either settled with the rent, or a second bargain is made for it. Where the holders are not pro-
prietors

† Lord Macartney's Papers.

prietors of the land, they make as good a bargain as they can, either from viewing it each year, or by commuting it for a fixed sum of money ;— which last mode is generally adopted. Many serious legal contentions have taken place, within the last thirty years, between the clergy and their parishioners. These have now nearly subsided ;— the clergy are moderate in their demands, and the people have generally seen, that to contend, where that is the case, is not for their interest. Accordingly in many parishes incumbency bargains have been made, in others for a term of years ; so that, upon the whole, the real value of the property is never obtained. The conclusion is highly to the credit of the moderation of the clergy.

Soil and Surface.

IN noticing the soils of this country, it is not meant to distinguish them with chymical accuracy, but to point out that quality which is sufficiently predominant in each to form a separate character ; neither can it be expected that, in a general account of an extensive country, every spot of any peculiar kind can be pointed out.

The

The prevailing soil in the plains and vallies is a strong loam upon clay; in many parts interspersed with * whyn stones, of various sizes, having the appearance of being water-worn; these lie on or near the surface, and sometimes so close as to resemble a rude pavement, the removal of which is absolutely necessary, previous to the operations of husbandry; in the best cultivated parts, this has in a great measure been done; but a sufficient portion still remains to shew the original composition. The substratum of clay, to which this soil is supposed to owe so much of its excellence, is however not unattended with disadvantage; it makes it tenacious of moisture, which in spring often retards the labour of the farmer, and when dry, beyond a certain degree, renders it difficult and protracted.

Judicious draining is the true remedy for both these defects. This prevents the moisture from remaining too long on the ground, and makes the soil less liable to be hardened, when the evaporating winds of spring prevail. The subsequent application of lime and other manures is attended with the happiest effects; the soil becomes kindly and fertile, affording to the occupier an ample return

* Whyn stones—Portions of basalt detached from the great mass, of which the mountains are composed, and often rounded by motion.

turn for his toil and his expence. As the ground rises, the soil assumes a different quality, and in many cases a different hue; the vegetable mould is less in quantity, lighter in texture, and in colour; it is no longer the pingue solum. The understratum loses much of its tenacity, and frequently degenerates into brown or yellow till. As the mountains are more closely approached in all directions, the deterioration is more perceptible, both from the scanty and coarse produce, as well as from the appearance of rocks and stones, which in many parts nearly occupy the whole surface. On the lesser mountains the soil sometimes undergoes another change, from the mixture of covering of peat or turf, which at certain elevations is generally to be found, forming by that means extensive tracts of moors.

Turf-bogs of various extent, and of different degrees of density, occupy the tops of most of the mountains, where they seem to bid defiance to the hand of the improver; nevertheless their coarse produce affords in the summer season subsistence to a hardy breed of cattle and sheep; for even in those dreary regions there are kindly and verdant slopes and vallies, which furnish those animals with change of food, and with shelter. The fuel from those bogs is of excellent quality, and, notwithstanding the damps and fogs, it dries, when early cut, in a manner

manner scarcely credible to those, who have not paid attention to it. The plains, which lie between the mountains and the Bann, are also overspread to a considerable extent with turf bogs; much of this could be improved on moderate terms, that, for example, between Ratholarkin and Ballymoney with several other bogs, which are in many parts clothed with green herbage. It would be difficult to ascertain the portion of the county thus covered, as it lies in so many detached situations; attended however with this advantage, that it gives the necessary supply of fuel, to the inhabitants, within reasonable distances. But the barony of Masserene, and a great part of the barony of Belfast, are not so well provided as those, which lie more to the north, most of the bogs in them being exhausted, except the southern extremity of the former, and what the mountains afford in the latter.

Sandy Soil.

To the west of the Lagan river, at a short distance from Belfast, a sandy loam commences, which with some interruptions continues to the Maze-course: this soil is, when under good management, very productive; yielding excellent crops of potatoes, grain of all kinds, and clover luxuriant in a
high

high degree. On the shores of Lough Neagh there are likewise some tracts of the same species of soil; that near Shane's Castle is formed in part of broken sand banks, and gives the lake, in this point of view, much the appearance of the sea. Small stripes of sand are to be found on different parts of the sea shore. It must however be observed, that in Malone clayey knolls are interspersed among the sandy loam, that clay also forms the substratum, that it is very stiff, and that both are strongly tinged with red.

Gravelly Soil.

The gravelly soil prevails in those gently swelling hills, which are to be met with in different parts of the county; they are composed of rounded or water-worn stones of different dimensions, with a slight covering of soil; some of the swells are detached, others in * ridges, which run with small intervals to a considerable length, like to that ridge which takes its rise at Dunmurry, crosses the road from Lisburn to Lambeg, and from thence runs near to Magheragall church, a distance, with its various windings, of not less than six miles; a continuation of the same, or a similar ridge makes its appearance
on

* These ridges are called Drumlins.

on the south-east side of the Lagan, and, I have been informed, has been traced many miles farther. Wheresoever this ridge has been opened, the gravel has the same appearance, howsoever different the soil on each side may be.

Limestone Soil.

Wheresoever the limestone has been stripped of its covering of basalt, and has advanced into the plains, and has acquired a covering of clay or of mould, there is formed a soil of peculiar excellence, adapted to every purpose of cultivation. Detached tracts of this nature are to be met with at the extremities of the limestone area; the most extensive one, that I am acquainted with, lies in the parishes of Maheragall and Soldierstown, stretching from the hill of Mullacartin to the verge of the county; on the coast also, near Redhall, at the point of Island Magee, near Glenarm, and at Balintoy, besides several other places, it makes its appearance. But the fertility, which this substance imparts to whatsoever soil it is mixed with, is nowhere more conspicuous than in the melioration of Ballypatrick mountain on the road from Cushindun to Ballycastle, where a considerable improvement has been achieved by mixing the fragments

of limestone with the moory soil, that covers it: the produce, an excellent crop of well saved hay, when I saw it in the month of August. Amongst the many advantages of this soil, its being most favourable to the progress of fruit trees must not be omitted; the freedom of their growth, the cleanness of their bark, and the flavor of their fruit, are real proofs of its excellence, which I have not seen more strongly instanced than in the productions of the garden at Red Hall.

There is another species of soil, which still remains to be mentioned; I cannot describe it better than by giving Mr. Sampson's words, taken from his "Derry Survey." Above the lime is the region of basalt, and the soil thenceforth is without clay. It is only a rust, or oxide, of the softer parts of the ironstone. It is loose, laves with moisture, and has neither cohesion nor strength; witness the wretched crops of every thing, but potatoes and straw. The country people call it deaf land." A great deal of this soil exists on our mountains. I have seen it about Carnickfergus, and have heard it complained of in nearly the same terms, as refusing a return to the farmer's labour; but, as it produces a kindly food for cattle and for sheep, nature seems to have pointed out its destination to be for grass.

Surface.

Surface.

In every country the most striking features are formed by the mountains; in this they are particularly interesting, not only from their offering to view, in their steep sections, the different strata of which they are composed, but from their elevation being greater on the coast, and their general descent inland; so that all the rivers, which run any length of way, rise near the sea, and have descending courses towards Lough Neagh and the Ban. To these points (Mr. Sampson observes in his Derry Survey) all the strata of the basalt and limestone in Antrim descend, whilst the strata of the same fossils in the county of Derry descend to the same point, though in directions contrary. This construction of country seems to shew, that Lough Neagh, which occupies the greatest part of the intermediate space, has at some period been the theatre of an extraordinary convulsion, which has disturbed the probably original, horizontal position of the strata. These mountains are wild; though not remarkable either for their elevation (the highest being only 1580 feet) nor for the irregularity of their outline, except where they approach the sea, and end in abruptness almost

almost perpendicular. As to their extent, they run nearly from the southern quite to the northern extremities, and, exclusively of their vallies, may be taken at one-third of the county. Between them and the sea, in some places, are tracts of very fertile land, as that between Belfast and Carrickfergus, and from thence to Glenarm; there the mountains nearly overhang the sea; and, in several places, it is with difficulty a road can be made between them, as at Dunmaul fort, near Nappan, and at the Garron point; from thence to Bengore Head, with little interruption, the arrangement of the coast is the same. The succession of different headlands in this course presents a number of the most picturesque views, to which the pencil alone can do justice. In some places the openings between these mountains shew narrow vallies, as Glenarve and Glendun, with their torrents, which contribute their part to the scenery of this curious coast;—and on others, immense masses of basalt and limestone, indiscriminately thrown together, form a scene of ruin, under different shapes, and compose a picture of wild confusion. In the openings of these mountains to the west, are some vallies of considerable extent and of great fertility. That of the Six-mile-water, which contains the villages of Straid, Ballynure, Ballyeston,

Ballyeston, Doagh, and Templepatrick, is a fine specimen of the beauty and cultivation of the county, to which the frequent white-thorn hedges contribute not a little, shewing, as the plains about Antrim are approached, the increasing richness of the soil by their superior size and vigour. In the higher parts of this valley the soil is much lighter, and less deep than in the lower, which, about Templepatrick, begins to assume the general characteristic of the county, having a large portion of clay in its composition.

In the valley of the Glenwherry, a branch of the Main Water, lie Kells and Connor; in a kindly but light soil, around the former, cultivation is good; potatoes, oats, barley, and clover all thrive in it, and the inclosures about Kells are equal to most in the county.—The valley of the Broad River, another tributary stream to the Main Water, contains the towns of Broughshane and Ballymena; it is neither so extensive nor so fertile as that of the Six-mile-water; the soil is light in colour and in texture, and, though well cultivated, especially in the lower parts, and favourable for crops of potatoes and oats (particularly of the potatoe oat) it is not found to be so much so for wheat or for barley. Whether this defect arises from the soil, or from the vicinity to the mountains, it is difficult to say; yet I am informed the fact is

so; though the white-thorn (supposed to be a proof of a good understratum, flourishes there, and the well kept fences of this plant, which ornament the country much of the way from Broughshane to Ballymena, especially about Ballygarvey and Drumfane, give an aspect of comfort and improvement to the whole scene. The mountains come close on the valley of the Ravel to the south-east; it contains nothing remarkable except the basaltic hill, on which the village of Clough is situated. This hill, like many others in the county, is completely insulated. From this to Clough Mills the surface is not unlevel, and the soil is good. From Callyjacky to Lough Neagh, the banks of the river Main offer many fruitful and well cultivated views to the eye, though in several parts the banks are steep quite close to the stream.

On both sides the river Bush there is much good and strong land. I observed excellent wheat and barley (though the former was in small pieces) between Stranocum and Benvariden, where Mr. Montgomery has done, and is doing so much. In the same valley, Mr. M'Naghten is also a considerable planter and improver; and Archdeacon Trail has made a beginning to improvement at Ballylough. On this river are the villages of Armoy and Bushmills; the latter serves as a retreat to the curious traveller

traveller, who has viewed the Giant's Causeway, from whence it is distant about two miles. Dervock lies on a branch of the same river; the improvement of this village was a favourite object with Lord Macartney.

To particularize all the variations of surface this county contains, would be most difficult; but the valley of the Lagan, bounded to the west by the mountains of Antrim, and to the east by the hills of Down, has claims to particular notice; whether the richness of the soil, the superior cultivation, or the beautiful undulating surface of the grounds be considered. When to these are added the number of excellent habitations it contains, with the plantations, fences, and gardens attached to them, and the bleach-greens lying close to the river, it may with truth be said, that few tracts in any country, of the same extent, exceed it in the beauty of its scenery, or in the value of its produce.

Between the mountains and the Bann, the general inclination of the surface is to the latter, which, as it is approached, grows more rapid; the flattest parts are the turf bogs, which occupy a great space, and are in most parts very capable of improvement; but the disposition of the surface in the southern part of the barony of Toome, along the shore of Lough Neagh, is very pleasing, as it consists of
numerous

numerous detached swells, which afford a variety, that no flat country can possess ; and which shews every improvement in the best point of view. Near this the most extensive level tract in the county commences ; which, taking in from Shane's castle a part of Toome, runs without much interruption through the south of the barony of Antrim, and the west of Masserene, along the shores of Lough Neagh until it meets the county of Down. It contains the town of Antrim, the villages of Crumlin, Glenavy, upper and lower Ballinderry, and Aghallee, and for cultivation, soil, planting and hedge rows, habitations and orchards, has the appearance of the best parts of England. The vicinity of Lough Neagh gives a cheerfulness to the whole ; and though many situations might be pointed out as deserving of notice, that particular part, which extends from Crumlin to Langford lodge, by Glendarragh, must attract the admiration of every person, whose eye is gratified with pictures of rural prosperity.

The soil in this district is generally strong loam with an understratum of clay ; which, being more or less mixed with the surface, forms a vegetable mould of different consistencies, according to the quantity of that substratum, with which it is combined. The richness and depth of these plains must in a great measure be owing to the deposition
of

of soil from the higher grounds ; for here the waters, being arrested in their course, have had time to part with the finer particles, which in a more rapid descent they must have carried with them. The surface of this division of the county is retentive of wet, and requires great efforts and attention in draining ; when that is performed and manure laid on, of which it requires a large quantity, no soil can better pay the cultivator's labour ; of this the occupiers in general seem sensible, and that their efforts have been successful, a view of the produce in the time of harvest must be convincing. Notwithstanding the general retentiveness of this ground, a deficiency of water has often taken place in the summer months. Killead in this instance was at times a great sufferer ; but the introduction of pumps, of which I am informed there are above two hundred in that parish, affords an ample supply, and precludes the necessity of driving the cattle to Lough Neagh in times of drought, which the inhabitants were obliged to do, sometimes from the distance of two miles. Other peculiarities belonging to the surface of Antrim, that remain to be pointed out, are those detached basaltic swells, and in some instances mountains, that occur ; of these Slieveish is, from its height and size, the most remarkable, and from its situation the most conspi-

cuous, standing on a valley to the south-east of Broughshane. The gravelly knolls also, which have been mentioned under the head of soils, are the next and last peculiarities, which shall be noticed. These gentle hills are not confined to any part of the county, though that near Lambeg, from its situation, has been most observed; I have met with them in many places; from Antrim to Kells they are particularly striking, and afford materials for the roads, wherever they are found; in their course they are winding like the beds of rivers, and their situations are generally in low grounds, from which they seem to emerge; to speculate on their formation would be idle, yet their component parts must have been subject to the action of water. I have given this short topographical description of the county; by some it may be thought too general, by others the contrary; the first may think it too concise, the latter too long; but so far as it goes, perhaps it will be found to be correct.—The map will assist in a view of the great features of it.

SECT. 2. *Climate.*

The climate of a country is often influenced by causes different from its mere position in point of latitude ;

latitude; thus, for example, Quebec, which is situated in a more southern latitude by some degrees than the south of England, is devoted to months of frost and snow, whilst the former is only occasionally visited by either. The climates of countries are also often changed by adventitious circumstances; the cutting down of woods and draining of marshes, by giving a proper circulation to the air, tend to their improvement, and render them more healthy abodes for mankind; formerly agues were the prevalent disorder of this climate; now they seldom are met with, except in those who have imported them from foreign countries. Though an excess of humidity seems the fault of our atmosphere, which is certainly neither lessened by our mountains, the retentiveness of our soil, nor our position between great bodies of fresh and salt water, yet it is wholesome; owing probably in a great measure to the constant ventilation it is exposed to; for certainly the calm days of this part of Ireland bear a very small proportion to the number of days the year contain; the wet days bear a much greater; but it is not the quantity of rain which falls, that so stores this climate with moisture; it is the want of evaporation; for one tropical shower will afford more water, than falls here in our most rainy season. It is to this moisture however
that

that we owe so much of our verdure; it is this which clothes our rocks, wherever they have a slight sprinkling of mould, with the most beautiful and softest turf.

If we have reason to complain of the moisture of our country, we have few other extremes to lament; we are seldom disturbed in summer with the effects of lightning, nor are we, in general, long confined in winter by frosts or snow. In spring our prevailing winds have an easterly direction; these prepare the ground to receive the seed, and after continue until June, when milder ones prevail. But weather, wet or dry, does not seem to be attached to any points, from which the winds blow; for it is observed, when the atmosphere has a tendency one way, all winds are alike, except the north, which seldom produces its proportion of rain. The western winds are the most violent; yet very strong gales, and heavy falls of rain from December until February often come from the south-east.

Fogs are frequent but not permanent, except on the mountains and in their vicinity; even there they are not of long continuance, often coming on and retiring in the course of the day. But between the mountains and the plains there is a great difference in the time of ripening the fruits of the earth, six weeks or two months sometimes intervening between
the

DIARY OF THE WEATHER AT MOUNT DRUID.

1802.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	365	
	1	2	4	3	5	0	0	1	4	2	0	9	39		
Snow, Sleet, or															
Fog	0	0	2	0	1	4	3	2	3	1	0	2	18.		
Showery	7	10	9	6	5	5	12	12	11	8	11	13	109		
Very wet	4	8	4	0	2	4	7	4	4	4	0	6	52		
Fair	20	10	13	19	24	21	12	15	15	19	19	12	204		

	Even.	40	40	30	02	37	55	51	45	41	40	30	Evening.
Morn.	S.	S.W.	S.W.	S.	W.	E.	N.W.	E.	S.	S.W.	S.W.	S.W.	Prevailing wind
Even.	W.	S.W.	S.W.	S.W.	N.W.	W.	N.W.	N.W.	N.W.	S.W.	S.W.	S.W.	Do. Evening

Hail.	7	2	2	0	29.2	30	0	29.2	28.8	29.2	64	62	60	56	53	50	46	48	S.W.	S.W.	17	117
Frost	7	2	2	0	29.2	30	0	29.2	28.8	29.2	64	62	60	56	53	50	46	48	S.W.	S.W.	17	117
Barometer, greatest height.	29.10	29.8	30.2	30	29.2	30	29.9	30	28.8	29.2	64	62	60	56	53	50	46	48	S.W.	S.W.	17	117
Do. Evening ..	30	29.8	30.1	30	29.2	30	29.9	30	28.8	29.2	64	62	60	56	53	50	46	48	S.W.	S.W.	17	117
Baro meter, lowest.	29.1	28.4	28.4	29.2	29.2	30	29	29.1	28.8	29.2	64	62	60	56	53	50	46	48	S.W.	S.W.	17	117
Do. Evening ..	29.1	28.7	28.8	29.2	29.2	30	29.2	29.1	28.8	29.2	64	62	60	56	53	50	46	48	S.W.	S.W.	17	117
Thermometer, greatest height.	47	54	52	57	57	64	62	69	65	63	52	51	50	47	49	47	46	47	S.W.	S.W.	17	117
Do. Evening ..	48	50	53	57	57	65	60	66	65	63	55	51	50	47	49	47	46	47	S.W.	S.W.	17	117
Thermometer, lowest.	35	39	40	46	46	50	56	57	54	46	47	38	38	38	38	38	38	38	S.W.	S.W.	17	117
Do. Evening ..	35	40	42	48	48	49	55	59	54	47	49	38	38	38	38	38	38	38	S.W.	S.W.	17	117
Prevailing wind	S. W.	S. W.	S. W.	S. W.	S. W.	N. W.	N. W.	S. W.	S. W.	N. E.	S. W.	S. W.	S. W.	S. W.	N. E.	N. E.	N. E.	N. E.	S. W.	S. W.	17	117

Hail.	4	4	5	1	0	0	0	0	0	0	0						
Frost.....	4																
Barometer, greatest height.	29.7	30.3	29.7	29.8	30.1	30.1	29.9	30	30.2	29.7						Morn.	
Do. Evening...	29.7	30.3	29.7	29.9	30.1	30.1	30	30	30.2	29.6						Even.	
Barometer, lowest.	28.6	28.7	28.8	28.9	28.9	29.1	29	29	29.3	28.8						Morn.	
Do. Evening...	28.7	28.7	28.9	28.9	29	29.1	29	29.1	29.4	28.8						Even.	
Thermometer, greatest height.	50	50	52	60	65	67	70	65	68	60						Morn.	
Do. Evening...	50	49	51	55	60	66	68	66	67	60						Even.	
Thermometer, lowest.	37	37	38	44	54	56	58	58	55	48						Morn.	
Do. Evening...	38	39	38	44	54	57	59	59	56	49						Even.	
Prevailing wind	S. W.	N. W.	S. E.	N. W.	N. W.	N. W.	N. W.	S. W.	S.	S.						Morn.	
Do. Evening...	S. W.	N. W.	S. W.	N. W.	N. W.	S. W.	N. W.	S. W.	S.	S.						Even.	

Do. Evening.	S. 12	W. 6	S. 11	NW. 7	NW. 11	NW. 17	NW. 16	SW. 15	S. W. 10		S. 10	S. 9	Even.
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DIARY OF THE WEATHER AT MOUNT DRUID.

1806.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Fair	10	16	17	21	23	22	19	14	18	15	6	8	192
Wet	8	8	5	0	2	2	2	5	6	7	16	11	72
Showery	13	4	9	6	6	6	10	12	6	9	8	12	101
Fog	1	1	10	2	2	2	3	2	3	3	4	4	37
Stormy	7	6	4	2	0	3	0	4	4	1	9	9	49
Snow, Sleet, or Hail.	13	7	1	1	1	0	0	2	1	1	7	2	36

[illegible]

DIARY OF THE WEATHER AT MOUNT DRUID.

1810.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Fair	13	14	15	17	23	21	8	13	16	16	12		
Wet	5	4	6	3	2	2	4	2	1	4	6		
Showery	13	10	10	10	6	7	19	16	13	11	12		
Fog	7	3	2	1	1	5	6	2	4	7			
Stormy	3	5	5	4	2		2	2	3	4	4		
Snow, Sleet, or Hail.	3	11	3	3	5	1	2				5		

Hail.

Frost	9	9	8	2	2	2			1	3		
Thunder and Lightening.				1			4	3		1		
Barometer, greatest height.	30	30	29.8	29.9	30	30.1	29.3	29.5	30.1	30	30.1	Morn.
Do. Evening...	30	30	29.8	29.9	30	30.1	29.8	29.9	30.1	30	30.1	Even.
Barometer, lowest.	29.3	28.6	28.6	28.8	29.3	29.4	29.1	29	29.2	28.5	28.1	Morn.
Do. Evening...	29.5	28.8	28.6	28.8	29.2	29.4	29.1	29.2	29.3	28.7	28.6	Even.
Thermometer, greatest height.	47	46	48	58	60	65	60	63	62	62	49	Morn.
Do. Evening...	48	48	46	60	62	67	60	64	63	60	49	Even.
Thermometer, lowest.	32	30	34	44	44	54	58	58	52	48	31	Morn.
Do. Evening...	33	31	33	41	45	56	58	58	56	50	32	Even.
					E. 11	S. 14	S. 20	S. 15	S. 19	S. 12	E. 8	Morn.

times of harvest; for it is not uncommon to see grain reaped in the latter, whilst in the former it is quite green. This difference arises from the degree of elevation the mountains possess, which through all the globe makes such diversity of temperature in places otherwise not far distant from each other. I shall here give the elevation of our highest mountains taken with the barometer by some gentlemen from Belfast.

Black mountains west of Belfast 1217 feet

Divis which rises behind them, }
when seen from Belfast } 1586

Cave hill - - - 1191

Agnews bill which, until measured, }
was supposed to be one of the }
highest in the county being } 1505
west of Larne - - - }

Slemish - - - 1398

To this there is also subjoined a diary of the weather for ten years, ending with 1810, kept by the Rev. Robert Trail, at Mount Druid near Ballintoy, on the northern coast, with the direction of the winds during that period, which will be interesting to those, who are fond of meteorological observations. From the known accuracy of the observer, they are to be depended on.

SECT.

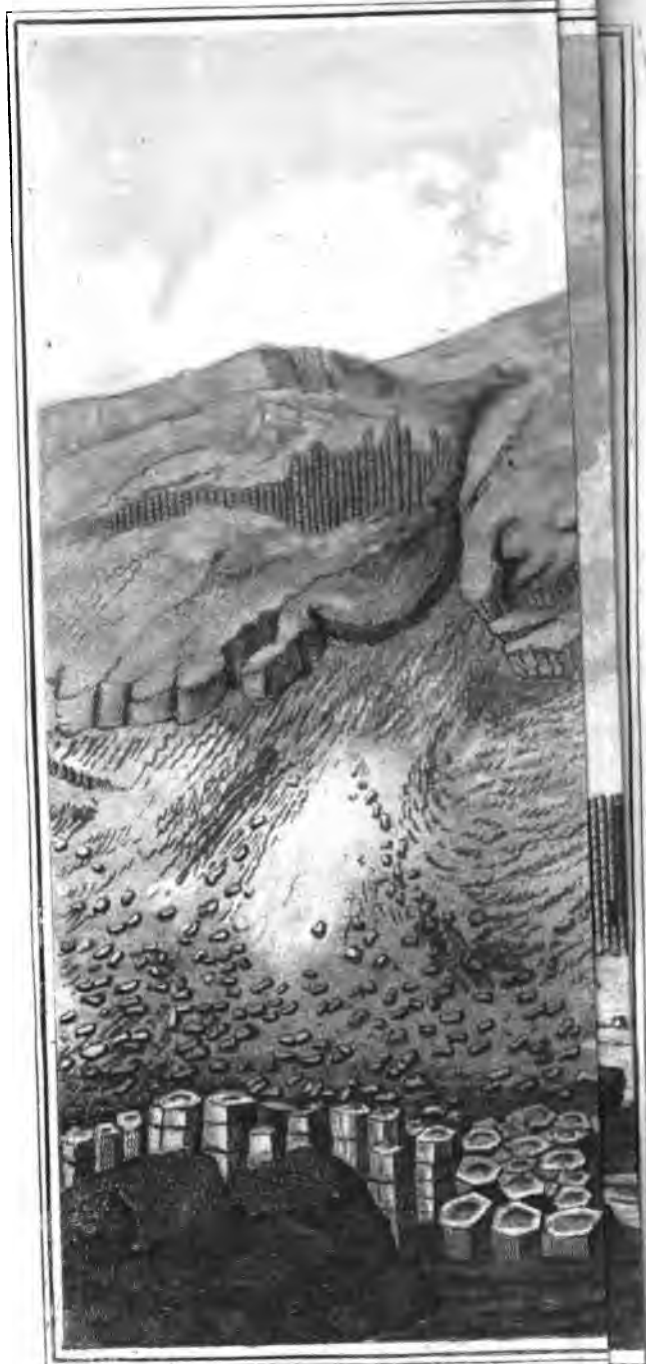
SECT. 3. *Fossils and Minerals.**Basalt.*

This fossil naturally claims the first place in a sketch of the mineralogy of the county of Antrim, as well from its pervading the greatest part of its extent, as from the strong interest it has excited amongst naturalists, arising from the extraordinary and stupendous regularity it has assumed on our northern coast; notwithstanding however, that its most curious and most interesting features are there displayed, its area is by no means confined to this county; for it extends into all those, which border upon it. * Therefore, in tracing its area, let Fairhead near Ballycastle be taken as one extremity; it extends from thence westerly to Magilligan in Derry, and is bounded by Lough Foyle; its southerly direction from Fairhead as far as the Blackhead in Island Magee inclines to the east; from thence diverging a little to the west, it passes Carrickfergus, Belfast,

* In Doctor Hamilton's map of the basaltic area he has marked the county of Down as an uncertain boundary, but I have traced it considerably to the eastward of Lisburn, to Moira, Maralin, Warringstown, which completes its circuit to the east. Innumerable whyn dykes issue from the great body, and penetrate as far as the channel.

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Rolling Hills



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Belfast, Lisburn, including the county of Down near Moira, and proceeding to the south as far as Portadown in Armagh, though after the mountains subside it is not always visible on the surface, nor is it regular in its outline; between that place and Loughgall it seems to be lost, the grey limestone commencing there; but the whynstones on the surface shew, that it is not far distant; it again becomes visible in the eastern part of Tyrone; and the western side of the mountains, which run to the north from Slieve Gallon, to Benyevenagh in Magilligan, shews it nearly in as great perfection as on its northern and eastern sides. The shape of this area is regular, approaching to a square, except at its southern extremity, where it seems to have deviated from it; and near Lisburn, where, contrary to the general idea, it crosses the Lagan (but not Belfast bay) and extends some miles in an easterly direction, sending forth innumerable dykes, which penetrate to the eastern coast; completing, according to Doctor Hamilton, a boundary which, taken in its entire course, amounts to a circuit of not less than one hundred and thirty geographical miles. This area contains many varieties of basalt, from the coarsest to the finest grained; from the amorphous to the most highly finished columns; from that species, whose friability amounts to rottenness, to that, which

which from its hardness emits fire upon percussion. But, however extensively this substance is diffused, its grand display is reserved for our northern coast, of which the two great promontories of Bengore and Fairhead form the leading features, and which stand at the distance of eight miles from each other; both formed on a great and extensive scale, both abrupt towards the sea and abundantly exposed to observation, and each, in its kind, exhibiting noble arrangements of the different species of columnar basalts. The former of these lies about seven miles west of Ballycastle, and is generally described by seamen, who see it at a distance and in profile, as an extensive headland running out from the coast a considerable length into the sea; but, strictly speaking, it is made up of a number of lesser capes and bays, each with its own proper name, the toutensemble of which forms what the seamen denominate the headland of Bengore. At the base of one of these capes to the west is situated the Giant's Causeway. This extraordinary production of nature first attracted notice about the latter end of the 17th century, as appears by a letter from Sir Richard Bulkley to Doctor Lyster, preserved amongst the papers of the Royal Society; who gives an account of it, received from a gentleman of Cambridge, who had seen it. In consequence

quence several queries were drawn up by Sir Richard Bulkley, which with their answers by Doctor Faley are to be found in the Philosophical Transactions; neither the answers, nor a drawing which accompanied them, seem to have given much satisfaction. Doctor Thomas Molineux was the next person, who took upon him to obtain information respecting the causeway; from his inquiries it appeared, that the stone, which had excited so much wonder, was not confined to the causeway but extended into the country; therefore, by his influence, the Dublin Society employed a painter of some eminence to make a general sketch of the coast near the causeway; but the artist seems not to have been qualified for the employment, having introduced many objects not in the least appertaining to his subject. From that period, this coast seems to have been unnoticed for near half a century; but in 1740 Mrs. Susanna Drury made two most correct paintings of the Giant's Causeway, which obtained the premium for the encouragement of the arts in Ireland; and these drawings being soon after engraved by an eminent artist, and published, the attention of the philosophic world was once more directed to this subject. After this Doctor Pococke made a tour through the county of Antrim, and was the only person, who appears to have taken a general view of the coast, of which he has given

a description; he formed a theory upon the formation of columnar basalts. About forty years ago the bishop of Derry (Lord Bristol) brought a painter with him from Italy, who took views in Indian ink of the most striking features upon the coasts of Antrim and of Derry; these, though not quite perfect, give a good idea of the subject as far as they go, and are upon the whole a valuable collection. In the year 1784 Doctor Hamilton published his "Letters concerning the coast of Antrim," and in 1790 a new edition of the same came out much increased. These publications on the basaltic subject, in which all the geological world was much interested, and on which many contrary theories were formed, were much attended to. By some of these theories the potent, clear, and often indignant pen of that accurate observer Doctor Richardson was called out, who certainly has favoured the world with more facts than any one, who has yet written upon the subject, but who has contented himself with combating the theories of others without forming any of his own. From his authority, from Doctor Hamilton's descriptions, from some observations of my own and from other sources, I have drawn up the following short description of some of the most striking features of our northern coast.

The Giant's Causeway is described as a mole or quay, projecting from the base of a steep promontory

montory some hundred feet into the sea, * and is formed by perpendicular pillars of basalts, which stand in contact with each other, exhibiting a sort of polygon pavement, somewhat resembling the appearance of a solid honeycomb. The pillars are irregular prisms, of various denominations, from three to five sides, but the hexagonal are as numerous as all the others taken together.

On a minute inspection, each pillar is found to be separable into several joints, whose articulation is neat and compact beyond expression; the convex termination of one joint always meeting the concave socket of the next; besides which, the angles of the under one frequently shoot over those of the upper one, so that they are completely locked together, and can rarely be separated without a fracture of these parts. The sides of each column are unequal amongst themselves, but the contiguous sides of adjoining columns are always of equal dimensions, so as to touch in all their parts. Though the angles be of various magnitudes, yet the sum of the contiguous angles of adjoining pillars always makes up four right ones, so that there are no void spaces among basalts, the surface of the causeway exhibiting to view a regular

* In August, 1587, the Spaniards lost nineteen ships, and 5394 men on the coasts of Scotland and Ireland: it is said they mistook the pillars of the Causeway for the chimneys of a town.

regular and compact pavement of polygon stones. Though the Giant's Causeway has often been compared to a honeycomb, which it certainly resembles much, yet accurate observers find a striking difference between their component prisms; the powers of the bee seem to be limited; it can construct its cell of no other figure than a regular hexagon; it is well known, that the hexagon is the only figure of more sides than four, of which a number put together can completely fill up space; yet it appears in the Giant's Causeway, that space is completely filled without any such limitation, figures of every number of sides from three to nine (as * Doctor Hamilton observes) being intermixed; yet the space is as accurately filled up as in the honeycomb, and so closely as to hold water, when an hollow in the surface suffers it to collect. Though the Giant's Causeway was the first assemblage of such pillars, as attracted notice, and is still admitted to be the most perfect group hitherto discovered, yet in point of magnificence that particular spot is inferior to many others on the same coast; and Mr. Pennant, probably knowing of no other columns in the north of Ireland, pronounced, that
basalt

* Since Dr. Hamilton wrote, figures of nine sides have been found.





Hill Waring Ledge

basalt pillars in the island of Staffa far exceed the Irish in † grandeur. He was not aware, that our coasts exhibit many miles of vast perpendicular precipices, lined with basalt columns, in parallel ranges, with a magnificence unrivalled in any other part of the world.

These extensive and towering precipices disclose to the naturalist the materials and arrangement of the strata, of which this country is formed, displaying a variety of the basalts of different forms, and of a different principle of construction, internal and external, such as has not been yet met with, or noticed in any other part of the world.

These stupendous façades offer a scenery, magnificent beyond description, to those who sail along their base, and discover many curious circumstances, which have hitherto escaped the notice of naturalists; I shall mention one. The Giant's Causeway, compared by Doctor Hamilton to a mole, and supposed by Messrs. Desmarey and Raspe to be a jet or current of lava running into the sea from the base of a volcanic hill, now appears to be a part of one of the original strata of our globe, placed at its intersection with the plane of the sea; this stratum is forty-four feet thick, and entirely composed

† The pillars at Fair-head are 250 feet, near five times as long as at Staffa.

composed of basalt pillars of that length; it is inclined to the horizon with a small angle, and, when traced from the causeway eastward, ascends obliquely along the face of the precipice. It culminates at about the distance of a mile from the causeway. Its upper surface is now elevated near 250 feet above the level of the sea; proceeding eastward it dips, and finally immerses at Portmoon, two miles east from the causeway, forming, at its immersion, the base of two beautiful conical islands. Magnificent as the colonnades may be supposed, which this stratum displays in so extensive a course across the face of these mighty precipices, they are by no means the finest; the stratum next but one to this is eleven feet thicker, and of course the pillars, of which it is entirely composed, are 55 feet, and its extent is somewhat greater than the former; the intermediate stratum is composed of another variety of basalt, prismatic but not columnar; this is 54 feet thick. The Giants' Causeway stratum, when it attains its greatest height, is the eighth, counting from the sea; all the lower ones immersing in succession, as they approach Portmoon; and where this stratum finally immerses, it has eight over it, four of them columnar, the pillars being of very different lengths, determined by the thickness of the stratum. The diameters of
the

the pillars, and the perfection or imperfection of their construction appear pretty much the same; whilst the whole mass of the strata are parallel to each other, and the pillars of the whole headland of Bengore appear naturally to affect a perpendicular position; and in the few places, where they lie in an inclined posture, it seems to be the effect of some external cause, which has deranged them from their original disposition. It is also worth remarking, that the ranges of pillars are more perfect, in proportion as they lie deeper in the ground. The second range in Plaiskin is evidently better finished than the upper one, and contains much fewer irregularities in the grain of the stone; whilst the pillars of the causeway, which run into the sea itself, have greater sharpness in their figure, and are more close and uniform in their grain. Two circumstances, I think, deserve to be mentioned, before I take leave of the subject of the Giants' Causeway: that only in three points do the columnar basalts come in contact with the sea; namely, the two intersections of the Causeway mentioned above, and at * Carrickarade, five miles to the eastward. Thus I have endeavoured,

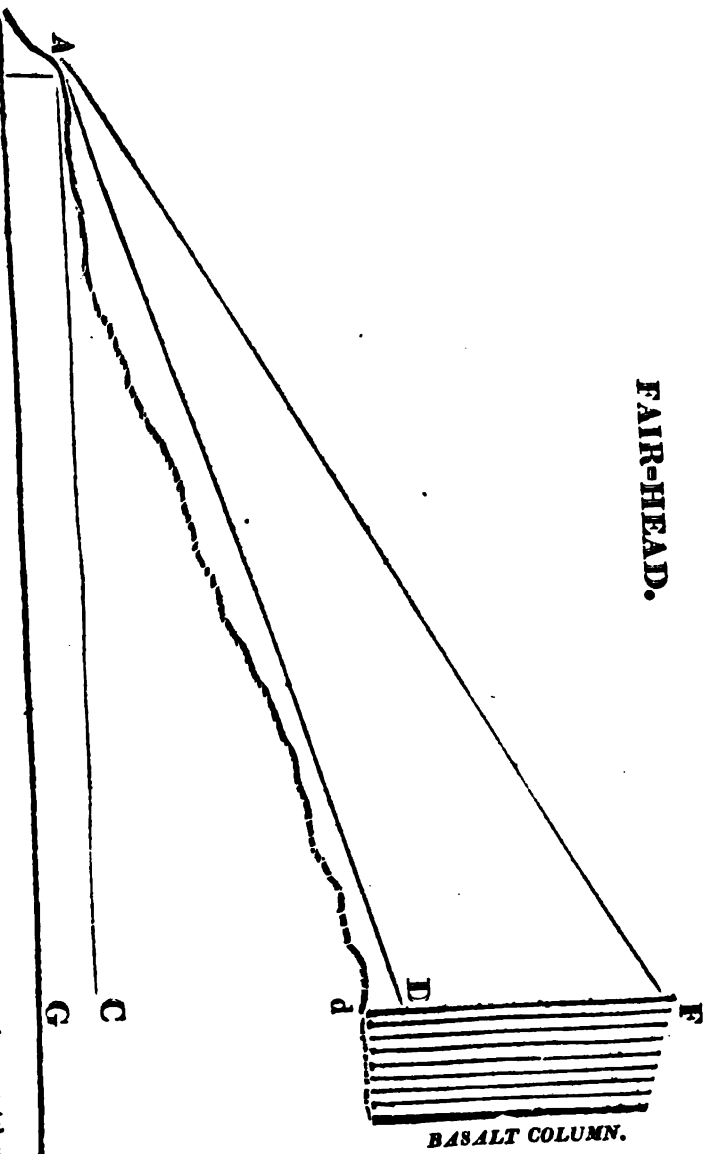
by

* Though the columnar basalts at Carrickarade are well defined, to outward appearance they are not separable, but form one mass.

by extracting from the best accounts of this wonderful production of nature, to give as concise and connected a description of it as possible, and one adapted to the nature of this work, which, whilst it forbids any interesting subject to be passed by unnoticed, equally forbids too diffuse a treatment of a subject, which might be said to be more curious than useful. The drawings of the Giant's Causeway, which accompany this, and for which I am indebted to the pencil of the Rev. Holt Waring, will convey a more accurate idea to those, who have not seen the Causeway, than any words can do; and to those, who have seen it, so just and spirited a representation of its subject must afford a pleasing contemplation.

At the distance of eight miles from Bengore (as was mentioned above) the promontory of Fairhead raises its lofty summit more than 500 feet above the sea, and forms the eastern termination of Ballycastle bay. It presents to view a vast mass of rude columnar stones, the forms of which are extremely coarse, so as to resemble an imperfect compact granite, rather than the uniform fine grain of the Giant's Causeway basalt. These pillars do not at first view appear to have any marks of articulation; but, on observing such as have fallen from the top of the promontory, they are found after to be separated into pretty regular

FAIR-HEAD.



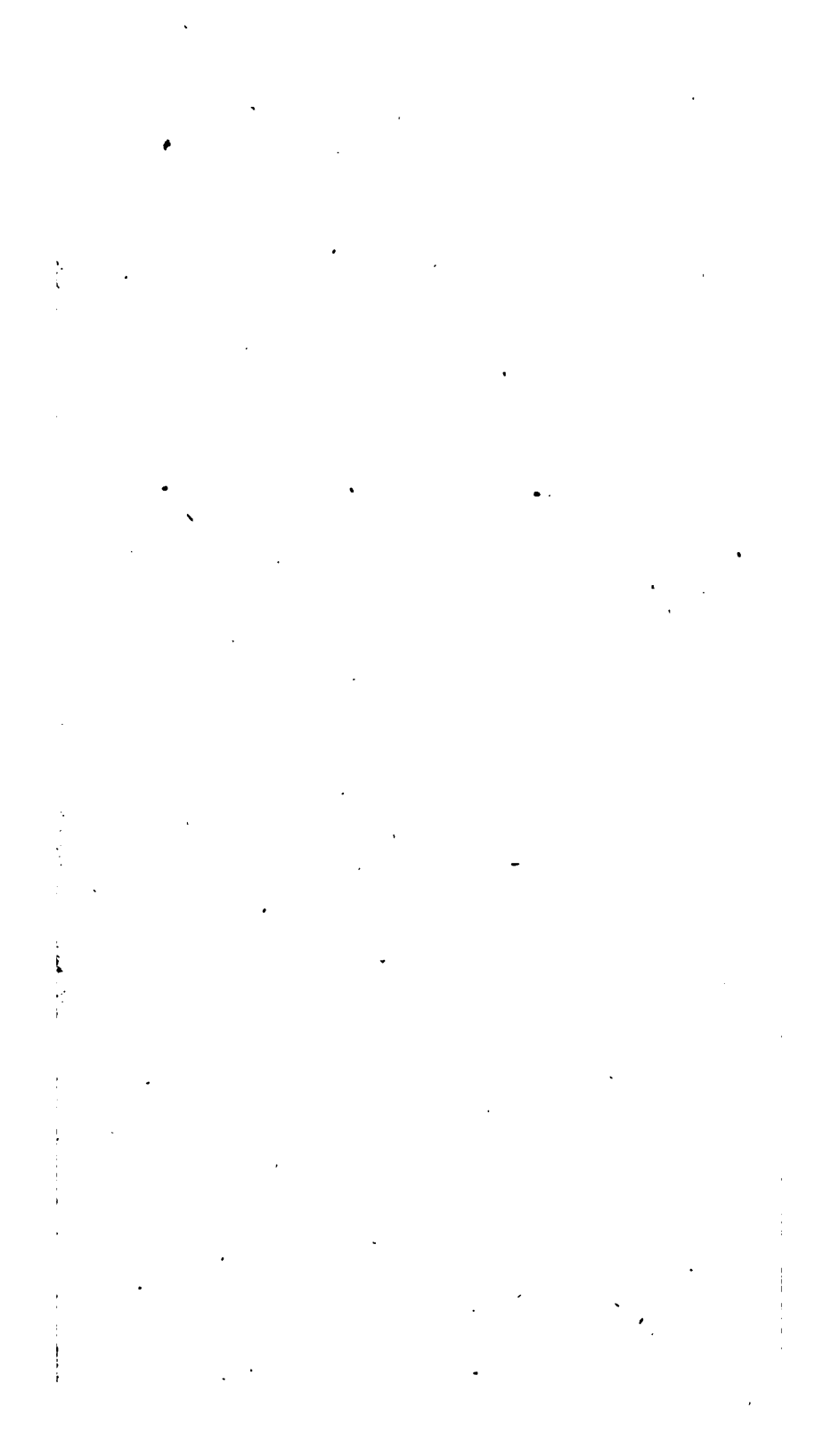
LEVEL OF THE SEA. B

A—B	50 Feet, by Estimation.
C—D	311 do. by Computation.
D—F	270 do. by Measurement.
G—F	631

F—d length of the greatest Column, 986 Feet.

Measured by Professor John Playfair and Mr. Jardine, in July, 1810.

P A C	89° 30'	The angles were taken by a mercurial horizon of Ramsden's pocket stand.
P A D	18 41	



gular joints by the fall. Though the basalts of these two magnificent promontories have been more particularly mentioned, there are many other similar arrangements, in different parts of the coast and of the country, which, though striking as great objects, yet become highly interesting to those, who wish to search into the natural causes, which may have produced those extraordinary pillars. The hill of Craigahullar, the south-east of Portrush, and the mountain of Dunmull, between Coleraine and the river Bush, shew abundance of this species of stone; the latter, particularly at the craigs of Islamore, where two ranges of columns may be discovered, and at most of the quarries, which have occasionally been opened round that mountain; they may be seen also at Dunluce hill, near the castle, in the bed of the river near the bridge of Bushmills, on the summit of the mountain of Croaglumore, in many parts of the high land over Ballintoy, in the island of Raghery, and various other places even to the entrance of Carrickfergus bay, at the Black Head, and, though they are very rude, are found so far to the south-west as in Glenavy river, near where it discharges itself into Lough Neagh. At the point of Doon, in the island of Raghery, the basaltic pillars deviate from the usual perpendicular direction, also near Ushet in the same island; they form a variety of regular curves.

From the beautiful and correct drawing of Plaiskin, which accompanies this work, and which I did not expect when I had written so far, I am induced to give a particular account of that cape, and the different strata of which it consists, both taken from Dr. Hamilton's Account of the coast of Antrim; these, joined to the plate, will give a good idea of its construction.

The natural basaltic rock lies immediately under the sod, having a hard surface somewhat cracked and shivered. About twelve feet from the summit, the rock begins to assume a columnar tendency*, and forms a range of massy pillars of basalt, which stand perpendicular to the horizon, presenting, in the sharp face of the promontory, the appearance of a magnificent gallery or colonnade upwards of sixty feet high. This colonnade is supported on a solid base of coarse, black, irregular rock, near sixty feet thick, abounding in blubs and air-holes. Under this bed of stone stands a second range of pillars, between forty and fifty feet in height, less gross, and more sharply § defined than those of the upper story; many of them, on close view, emulating the neatness of the columns of the Giant's Causeway. This lower range is borne
on

* This is what Dr. Richardson, I think, calls the irregular prismatic.

§ The pillars seem better finished as they approach the level of the sea; the lowest range of the causeway is the neatest of all.



on a layer of red ochreous stone. These two ranges of pillars, together with the interjacent masses of rock, form a perpendicular height of one hundred and twenty feet, from the base of which the promontory, covered with rock and grass, slopes down to the sea for the space of two hundred feet more, making in all a height of near four hundred feet.

Arrangement of the Strata of Cape Plaiskin.

	Feet
No. 1. Summit, irregular basalts, shivered and cracked at the surface	12
2. Perpendicular range of gross pillars	60
3. Gross bed of rude basalts, shewing marks of a tendency towards forms	60
4. Second range of pillars, divided into joints	40
5. Bed of red argillaceous ochre, on which the second range of pillar rests	22
6. A thin course of iron ore in a bed of ochre	
7. Soft argillaceous stone, of various colours, and mottled appearance, friable and resembling steatites	
8. Succession, or 5 or 6 gross beds of table basalts, between which thin strata of ochre and other sub- stances appear	180
Total	374

The

Other varieties of basalt are, the stratified, the irregular prismatic, the amorphous, the whynstone of our fields, and that variety containing marine exuviae; the first is found on the summit of the mountains, where no columnar basalt is seen; the second is an usual accompaniment of the columnar, their strata generally alternating, its lower edge formed into small prisms, shooting in various directions, while its upper part is amorphous.

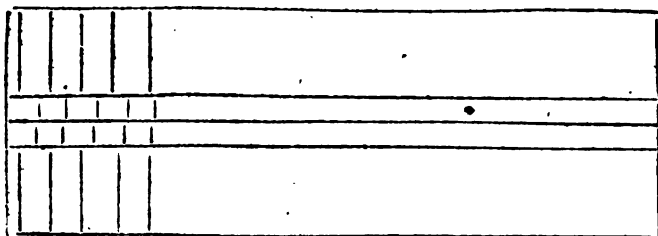
The amorphous lies in large masses, of different degrees of hardness, sometimes unaccompanied with any dissimilar substance, and sometimes having zeolites, ochrea of different kinds, iron ores and clays intermixed; to these may be added steatites, rock crystals, and calcedony. In this species are found cavities, which in many instances contain water, the surface of the cavity being polished, and in colour not unlike the dark earthenware invented by Wedgewood. The more friable stone of this species, called rotten rock, seems to differ from it only in its being in a more decomposed state, and generally contains the substances enumerated above. The whynstone of our fields appears to have been at some period detached from the great mass of the same kind of stone, which abounds in our county; it is the rounded field stone usually found on or near the surface of our lands, and belongs to the hardier variety of basalts. The
basalt

basalt containing marine exuvia, and first observed by Doctor Richardson, is found in abundance at Portrush and the Skerrie islands; it is full of belemnites, and of pectenites, but above all of *ceratium ammonis*; they are dispersed through the whole mass, equally abundant in the interior and on the surface. This basalt vitrifies, and the marine substances, it contains, calcine in the fire of a common glass-house.

But of the numerous varieties, which have been observed by, and have given birth to the speculations of the curious, none deserve more notice than that species known by the name of *whyn dyke*, which diverge in such numbers from the north and east sides of our basaltic area.

Whyn dykes are mighty walls or steps of basalt, which issue and diverge from the north or east sides of the great area of the basaltic country; they are composed of rude prisms laid horizontally, their thickness from twelve to fifteen feet, and often much more, though in some instances they do not exceed one or two. They first shew themselves in the face of the highest precipices, where they are seen verically cutting the several strata, of which these are composed, descending to the sea, where they are sometimes lost; but in many cases their course can be traced to a considerable distance in that element; as yet it has not been ascertained in any

any one instance to what depth they reach beneath the surface, even in the deepest mines; they penetrate indifferently all substances, which are encountered by them,* and proceed to a distance almost incredible; a part of their stupendous height alone can be measured, namely that which appears above the surface, at the mile-stone, part of a dyke near the Giant's Causeway, 100 feet, at Port Spagna 330, at Fairhead more is visible. I shall here give the plan of the stile of masonry (as Doctor Richardson justly expresses it) of one of these dykes, taken from a Memoir of his on the subject. This dyke lies to the east of Ballycastle, and is so accessible on the beach, that its singular construction can be examined without trouble; the breadth is 12 feet; it more accurately resembles a quay than any of them; its surface is flat, its sides perpendicular; it is divided in its whole length by three right lines, one bisecting it through the middle, and one on each side of this, about a foot distant.



The

* The writer of this traced a whyn dyke to the mountain of Slieve

The bases of the long prisms shew their polygonal figures on the sides of the dyke, and, if taken up and laid down horizontally, would exhibit a rude pavè. These prisms are evidently composed of smaller ones, like those at Port Spagua.

I have also given a drawing of the remains of a dyke at Port Cooan,* which appears to have been composed of seven walls, and to have been separated by some convulsion from the dyke, which shews itself in the face of the precipice, as well as a mass of basalts to which it adheres; together they form a small island of a most singular appearance. The view of this dyke may be considered as an elevation to the above plan. These singular walls are not confined to the northern coast of the basalt country; its eastern side abounds with them still more, but I have not been able to ascertain whether they penetrate to the westward. At the same time I must not omit the mentioning of a circumstance generally attendant upon the whyn dyke, curious as any fact in natural history. I mean the frequent
dislocation

Croob, in the county of Down, where it runs up the bed of the river Lagan, in a south-east direction, cutting through schist, granite, porphyry, gneiss. He has heard that it penetrates that mountain, appears on the east side, and is lost in the channel.

* Doctor Richardson has promised a Memoir on this dyke: the view of it was taken in company with him.

dislocation of the strata, cut by them, or through which they pass ; or, as Dr. Richardson expresses it, the sinking or subsiding of these strata on one side, without disturbing their steady parallelism. This circumstance, so extraordinary to the naturalist, becomes to the miner an object of the greatest importance. Whatever be the order and thickness of the various beds of fossils, which occur on one side of any of these divisions, the same general arrangement and proportions may with great probability be expected on the other side, only with this difference, that the entire mass will oftentimes be found to have altered its relative place, each stratum appearing in a more elevated or depressed situation on one side of the partition than the other ; so that correspondent beds will no longer be found in one and the same plane, but must be sought for at different degrees of elevation, and it is only by comparing the stratum, into which he has pierced, on the unexplored side of the partition, with the correspondent one, on that side where he has already wrought, that he is directed, whether to work upward, or downward, in search of the mineral he has lately lost. These dykes differ materially from each other ; in many the middle part and sides are not of the same grain, nor constituted upon the same principles ; in some, zeolite
is

between which they lay. These freestone walls are more than a foot broad, and sometimes composed of horizontal laminæ, and at other of vertical. But, as Dr. Richardson well observes, human attention could not follow the variety nature has displayed in the formation of these dykes. I shall therefore on this subject only observe, that the whyn-dykes, which traverse Scotland, are supposed to originate in Ireland.

The Scotch whyn-dykes have been generally supposed to originate in Ireland. If this fact be admitted, we can easily trace them by attending to the directions of our own; thus, those that issue from the coast west of Ballycastle, proceeding north, with a slight inclination to the east, are to be sought for in Islay, Jura, Mull, &c. where Mr. Mills actually found them in great numbers.

Our dykes, which are seen at Murlogh, Torr, and Cushendun, are obviously those, which have crossed the Mull of Cantyre, and were observed by Mr. Jameson in such abundance in the Isle of Arran.

Doctor Hutton also mentions twenty or thirty whyn-dykes he found "in the shire of Ayr, to the north of Irvine, on the coast." These correspond with the numerous dykes about Garron point, and its neighbourhood, whose rectilineal course is directed towards that part of the Scotch coast.

The

The dykes about Larne may be expected to be found on the Mull of Galloway, while those I examined far up in Belfast lough, on account of their south-east direction, probably do not catch Scotland, nor meet land until they arrive on the coast of Cumberland*.

I shall take leave of this curious and interesting subject with the following extract from Doctor Robertson's Perthshire: — " Behind the wood of Methven, there is a singular ledge of rocks crossing the river Almond, known by the name of the Devil's Bridge; one end rests on the estate of Methven, the other on the estate of Lednock. Nothing remains of this magical bridge except the abutments, all the arches having fallen. These abutments are some hundred feet high, the stones all nicely jointed, having the appearance of the hewn rent of an old fortification."

" This ledge is a part of a small ledge of rock of a uniform quality, which crosses Scotland from sea to sea, in the direction of south-west and north-east, almost parallel to the Grampians. In this country it frequently appears above ground, particularly in the Breas of Donne, at Muthel, at Methven, and at the Linn of Campsie on the Tay.

* Dr. Richardson.

Tay*." From this description it appears, that this extraordinary ledge must be a whyn-dyke; and on tracing its course through Perthshire, it appears also to be one of those, that issuing from the coast of Antrim, between Larne and Glenarm, passes under the Frith of Clyde; and shews itself in Scotland, in the direction above mentioned.

*Of the Fossils, which are found in or near the
Basalt.*

The first of these which claims attention is zeolite, which has given birth to a variety of opinions; by some it has been alleged as a proof of the volcanic origin of the stones, in which it is found; by others as supporting a contrary theory. I am happy therefore to have this work accompanied by a Memoir on the subject, from the pen of that accurate observer, Doctor Richardson, and also on the subject of the ochres, which are so frequently found amidst the basaltic beds through different parts of the country. His ideas on these points appear in an appendix.

Besides the above mentioned substances, iron ores of different kinds are not uncommonly found
in

* The Almond falls into the Tay, north of Perth.

in or near the basaltic precipices; thin strata of that rich species, called hæmatites, are found amongst the beds of argillaceous ochre, which divide them; and on the sides of the mountains, and in the vallies, that species called bog ore, probably washed down from the more elevated situations.

Beds of puzzolane shew themselves in different parts; from a quarry of this kind, in the island of Raghery or Rathlin, 500 tons were taken by one of the Canal Companies of Dublin, which answered the purposes, to which it was applied, as well as the foreign kinds of cement*. Argil as well as silix and iron abounding in this basaltic country, it cannot appear strange, that the combination of it with silix should produce the various clays and colorific earths, which proceed from their union: accordingly fuller's earth is found, and clays of all kinds; from those baser sorts, which make the coarser pottery, to those finer clays, which in strong fires only undergo an incipient vitrification, and are therefore fit for porcelain. Soap-stone, of a purple colour, in a large stratum, shews itself in the cut of a small river between Larne and Killwater. Fuller's earth is so frequent, that it would be unnecessary to specify every

* Mr. Templeton.

every place where it abounds; it is to be met with near Mr. Joy's cotton mills, in the Falls of Belfast, at Bamer's Glen near Trumery, in the island of Rathlin, &c. &c.

From the combination of argil and silex with iron the rough tripoli proceeds, and French chalk is only an ochre with a larger portion of argil; the former shews itself in the bed and banks of a river on the south-west side of Agnew's hill; the latter in the path to the Gobbins, in a large vein. To these valuable materials may be added manganese, so useful in the manufacture of pottery. This metal, which is also applied to the making of glass, exists in many parts of the county, and, though what has been tried at Ballycastle has not been found so good as that imported, yet little doubt can be formed of its being in other places equal to it; as that, brought by Mr. Donald Stewart to the Dublin Society's house, has been found upon trial to be good.

Calcareous Limestone.

A vast stratum of white limestone, about two hundred feet in thickness, and in its general course considerably elevated above the level of the sea, is
the

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the body, upon which the immense mass of basalt rests; this is of the same extent as the basaltic area, but discoverable only at its periphery, though in some cases even there its appearance is interrupted; for, wheresoever the columnar basalts occur, the limestone seems to shrink from them, and is very rarely found, nor does it ever approach them without evident signs of derangement. In some places it is depressed greatly below its general level; after a short space, it is borne down to the water's edge, and can be traced under the surface of the sea; then it dips entirely, and seems lost under the incumbent mass; again, however, it emerges, and, with a similar variation, recovers its original height.

By tracing the progress of the limestone eastward from Portrush, where it makes its first appearance on entering the county of Antrim from the west, the extraordinary effects of the columnar basalt on the limestone stratum will more plainly appear.

The chalky cliffs are seen a little to the eastward of Portrush, where they form one of the finest and most interesting views on the coast; the forms, into which these rocks have been thrown by nature, and by the depredations of the ocean, imparting to them features, that cannot be described.

After

After a short course, they are suddenly depressed to the water's edge under Dunluce castle, and soon after are lost entirely, in passing under the columnar hill of Dunluce, which lies at a little distance from the sea. At the river Bush the limestone recovers, and skims for a short space along the level of the sea, but vanishes on approaching towards the great promontory of Bengore, which abounds in every part with columnar basalts; under this headland it is lost for the space of more than three miles eastward; from thence, beyond Dunsewrick castle, it again emerges, and, rising to a considerable height, forms a beautiful barrier to White-park bay, and to the Ballintoy shore. After this it suffers a temporary depression near the basalt hill of Knockooghy, and then ranges along the coast to Ballycastle bay, "from Kenbaan head, which is the spot where the limestone and basalt come in contact in every possible way."

"Pieces of limestone, imbedded in the basaltic mass, and similar fragments of basalt dispersed in like manner through the limestone; and in the precipice above, strata of basalt and limestone alternating. Here the opportunities of examining into the contact of basalt and limestone are numberless, and on every occasion they are found solidly united; the line of demarkation correct, as if
drawn

drawn by a pencil, but not the smallest trace of calcination."—*Doctor Richardson.*

Between Ballycastle and Fairhead alternate strata of coal and sandstone intervene, then Fairhead magnificently towering with its massive columns of basalt; but the limestone once more rises to the eastward, pursuing its devious course, with some interruptions, and forming, on the shores, a line of coast the most fantastically beautiful that can be imagined. Between Glenarve bay and Glenarm the confusion of the basalt and limestone is so complete, that it is difficult to ascertain, whether there are two different strata of each, as the immense fragments of both lie in the most chaotic confusion. At Dunmaul fort, near Naphan, the top of the mountain is basalt, then limestone; under that is the fort, cut out of the basalt, and beneath that limestone to the surface of the sea.

From Glenarm to the neighbourhood of Maharalin, in the county of Down, the most southern point to which limestone extends, it may be traced, either along the coast, or in the eastern and south-eastern faces of the mountain; but in one part of its circuit it suffers an entire depression, at Blackhead, the most southerly point of Island Magee; here the basalt is columnar, and this seems to be
the

the boundary of that species of stone to the south. This vast body of calcareous matter is disposed in regular strata, which, when undisturbed, preserve, as Doctor Richardson well expresses it, "a steady parallelism, and are in many parts separated by layers of flints, which, in the operation of raising, shiver into pieces of various shapes and sizes; other portions besides there are found, standing perpendicularly over each other, and joined by a narrow neck of limestone, funnel-shaped, as if in a liquid state they had been poured into a cavity formed to receive them.

At the further extremity of the limestone, where the country subsides into gentle hills, it is mostly divested of its covering of basalt, clay of a reddish colour, and of various depths, taking its place. In one part of its course, from Brook-hill to Trumery, it forms a kind of table land, being detached from, and elevated above the general surface; but still it is accompanied by the basalt, though not crowned with it. For all round this ridge, quarries of it stratified as perfectly as in any part of its course, and extending far beyond the limestone limits, are found; and very often these substances are found in contact, the sides of each standing nearly parallel to each other. Notwithstanding the general hue of this limestone

is

is white, and in its nature not adapted to take a fine polish, yet in different situations specimens have been found of a finer texture and superior hardness; the variegated blue and white, or dove-coloured marble, on the lands of Ballymurphy, two miles from Belfast, is in great abundance. In Collin Glen there is also a stratum of the same kind, which Mr. D. Stewart thinks is part of the same vein, which is seen in Ballymurphy; some of the white part, he says, is as transparent as statuary marble.—“In Bamer’s Glyn, near Trummery, is a stratum of fuller’s earth, one foot thick; it lies between the limestone and the basaltic rock. *Here is fine red marble*, and remarkable red-coloured flints.”—D. Stewart. I make this quotation as an introduction to a curious circumstance respecting this yellow, and in some situations reddish marble; all the limestone quarries in a certain direction, I believe to the south-west, in that part of the county are traversed by a whyn-dyke, far advanced to a state of decomposition, and bedded in its whole course sometimes in a yellowish, sometimes in a reddish ochreous substance. It appears to be this substance, which has imparted the colouring matter to the limestone, and which is also much harder, much finer in the grain, and more completely crystallised, than any specimens hitherto met with. Pieces of this
marble

marble have been sent to the Dublin Society; when cut and polished, they are nearly equal to the best imported; the disadvantage of it is, that it cannot be raised in large blocks.

The remaining varieties of calcareous substances are, micaceous limestone found at Toberbelly, near Ballycastle, which makes good lime for mortar or for manure, and is of the same quality with that used at Dalmully in Scotland. On the Black mountain that species, denominated phosphoric limestone, is met with; likewise at Church Bay, in the island of Rathlin. On the mountain just mentioned, at the height of about 1100 feet, is a kind of calcareous sandstone, containing a variety of shells, among which some of our native ones may be recognized, as *arcta glycinaris*, *pectens*, *cardium edulis*, and intermixed with the *mytilus instatus*, fig. in White's Natural History of Selbourne. *Ammonix serpulæ*, * &c. &c. Limestone gravel exists in many parts, at Ballinderry near the corn mill, in the river Dumart, also at Portmore park in the parish of Glenavy. D. Stewart † says, the limes are large, of various colours, and resembling petrified bulrushes; these must be coralites.

The

* Mr. Templeton.

† In the Isle of Muck, near Larne, is a large course of grey limestone between the white.—Mr. D. Stewart.

The same gentleman also takes notice of a limestone quarry near Templepatrick, on the north side of the mountain from Belfast; but this quarry, from the quantity of *silex* it contains, will not answer for making lime. Limestone only exists on the extreme verge of the county; I know of no instance, where it has been found penetrating far into it. Marine exuvæ of different kinds are imbedded in the limestone; bones, also, of terrestrial animals. I have seen the bone of a hand, supposed to be that which supported the middle finger, which was found at a great depth in a limestone quarry, and I have one part of the rib-bone of a cow, or of some animal of that species, as perfectly shaped as if just taken from the carcase.

According to Mr. Sampson, with whose observations those I have made agree, this immense body of limestone rests in some places upon a green marle-like substance,* which does not effervesce with acids; also on a red clay, which dips and rises with it. This red clay has frequently pieces of soft calcareous earth interspersed with it, in a state like putty; in many instances it is lamellated, and of the finest and most unctuous feel, free from any mixture. In the contact of limestone with basalt, there

* The lower stratum of limestone at the quarry on the left hand of the road, at Cave Hill, is quite discoloured with this substance.

there is a mixture of reddish ochreous matter, including nodules of flint, or in masses of flints agglutinated; no marks of calcination, but it is shivery and shattered in several places, and even contains shells immediately in contact.

The calcareous petrifications, that occur on the shore of Larne lough, not far from the town on the approach from Carrickfergus, seem to be entitled to a place in this division of the work. The well, which to all appearance is the agent in this operation, lies close to the high-water mark, and issues from the bank just below the road. The beach is formed of a stiff blue clay, which in many places has wilk and other shells lying upon the surface; these, when deprived of their fish, are by the rolling of the waters filled with the clay, and, coming in contact with the water of the well, become one solid mass of calcareous substance, the whole the colour of the clay. That the well has the power of performing this, is clear from these petrifications being found close to it, and from other substances of a like nature being thrown out of it from time to time, as the jointed and angular stones, that creep in vinegar. These stones, called from their shape *astroides*, being placed in a saucer, and immersed in acid, immediately begin to effervesce, which causing a gentle motion, they glide down
the

the inclined plain of the saucer until they meet in the middle of it.

This quality must be imparted to this well from its taking its source in, or running through a stratum of limestone, with which it must be highly saturated during its passage. There are several streams in this line of coast, that take their rise in in or above the limestone stratum, which in their course meet with openings, through which they disappear for some space, and burst out lower down. Two instances of this occur, one near Kilwalter, and the other in the glen at Red Hall. But of petrifications, found at the issue of these streams, I have not heard.

The sudden breaking out, and quick disappearing of springs, is common in all limestone countries. For the same construction of the strata, which from their openness enables them to gush out in one place, facilitates their entrance into them in another. In the county of Clare, which is a limestone country, I am informed the number of these partly subterraneous streams is very great, and some of them are very large.

Gypsum Alabaster.

This fossil is found on the Forth river near Belfast, and in several other places on the coast from thence to Castlechichester, in Island Magee; on the Forth river it runs in veins in the steep banks, which are formed of a most tenacious clay, that effervesces with acids; these veins are of various depths, from three or four inches in thickness to that of a line, so as scarcely to be perceivable except from their whiteness contrasted with the redness of the clay, in which they are imbedded; the manner, in which the gypsum is extricated from the clay, is by striking the latter with pickaxes, as sharp and as well tempered as possible; above the veins the tenacity of the clay is such, that not more than the size of a walnut can be taken away at one stroke, which makes the difficulty of procuring the gypsum very considerable. In some instances the clay, in which gypsum is found, is of a fine blue colour resembling Prussian blue; the clays of this kind, that I have tried, effervesce also with acids; invariably however its situation, so far as I have observed, is on the verge of the limestone country, but much under the level of the limestone, and not much above the level of the sea; in the intermediate

diate stratum between the sandstone and the limestone. In that portion of the county, where it is met with, the limestone lies very high in the faces of the mountains, where it does not appear to have been disturbed by any violence; where the limestone has been brought below its usual level, as in many places it appears to have been, there I have not heard of any gypsum having been found, so that its formation appears to have been accomplished in, and confined to that stratum; what is now gypsum has probably been chalk, or limestone reduced to a chalky consistency, as it is often found in clays; the vitriolic acid, which is necessary to its existence, having also been afforded by the same stratum, from which it is taken. How this operation has been effected, I shall not presume to inquire. I have never met with gypsum in large masses, as it is found in other countries; it is seen in regular ramifications, proceeding from a stem; these ramifications, as well as the stem, often horizontal, but often deviating from that position though not in any great degree. It very much resembles the horizontal branch of a tree stripped of its leaves. The use, to which this fossil is applied, is the running of cornices, coating ceilings and walls, and making other ornaments for apartments, to which it is well adapted; it is first roasted, then pounded and sifted; and, being afterwards mixed with a proper

per proportion of lime, run into a paste; it quickly grows hard, and, when completely dry, acquires a beautiful milky whiteness. It is sold by the hundred weight or ton, as it is required by the persons who raise it. Most of what I have seen is of the striated species, though I have sometimes met with most beautiful specimens of it lamellated and as clear as talc. These were not so large as the Russian talc, seldom exceeding two or three inches in diameter; but very clear, though not quite transparent. It has not been tried as a manure so far as I have heard; but it is of that kind, the striated, which is said to answer that purpose.

In addition to the above I must not omit to mention, that many years ago gypsum of a superior cleanness, much resembling talc, was found at Megabuy hill, in the parish of Maheramesk, by persons employed by Lord Conway to search for coals; and that in the bed of a rivulet, between Maheragall church and the white mountain, there is a clay, that has the same appearance as that, in which it is found near Belfast and Carrickfergus.

Coals.

The working of this mineral has hitherto been confined to the vicinity of Ballycastic; every attempt
towards

towards finding it in any considerable quantity in any other quarter has so far proved abortive. The collieries lie between the town and Fair-head, which terminates the bay of Ballycastle to the east. The coal lies in an abrupt bank, which overhangs the sea, and is first seen at the Salt pans, its westerly point—from thence it runs eastwardly along the coast for about two miles; here the blazing coal is lost, but at the commencement of the Fair-head * a blind coal has been discovered, which from its utility promises to become a profitable article to the owners. This species is also found on the east side of the same promontory, and is separated from the blazing coal by a whyn-dyke, at a place called Whaley's folly; these two species are never found in contact, neither contiguous nor intermixed. The different fossils, commonly situated above the coal of this place, are ironstone, black shivery slate, grey, brown, or yellowish sandstone, and basalt, or whynstone; the three former of these appear to be usually attendant on coal in the northern parts of Ireland; but the sandstone, which may be traced from the southern to the northern extremities of the country, and which seems to be the body, on which
all

* In 1807, in working this coal, the miners came to *fauls* consisting of shells, mostly of the limped species, which they got through and recovered the coal.

all the other strata rest, is here out of its usual level, being as it were forced up from its natural place and hemmed in by basalt, which it equals in elevation. All these strata are tolerably regular in their disposition, forming a small angle with the horizon to the south, and shewing their edges in the steep cliff itself; or (as the miners term it) bassetting to the north; but it happens not unfrequently, that they are intersected by thin septa of hard and firm basalt, which standing perpendicular to the horizon, cut them in two, forcing through every opposing barrier in a precipice three or four hundred feet high, pursuing a direct and uninterrupted course, as far as the eye can trace them under the surface of the sea, or as far as human industry and perseverance has attended them into the bowels of the earth. The properties of these * walls or dykes having been described above, I need not add any more on the subject than to say, that the miner, who has occasion to break through one of these divisions, is almost certain that he will immediately lose the bed of coal, in which a short time before he was working; and it is only by comparing the stratum, into which he has penetrated, on the unexplored side

* These partitions are known also by the term, gaw or march, and seem to agree pretty much in situation with the cross gossan of the Cornish miners.

side of the partition, with the correspondent one, on that side where he has already wrought, that he is directed, whether to work upwards or downwards, to recover the course of the coal. The veins of coal are from two and an half to five feet in thickness, and generally run from the north-west to the south-east, dipping gradually from the shore as they proceed into the country; until 1807 none of the levels extended beyond 900 yards; for, there a whyndyke towards the south had hitherto prevented the workmen from penetrating further in that direction.

All the mines are worked and drained by levels running into the country; no shaft is sunk, except for the purpose of ventilating the different apartments. At a former period, when the steam engine was unknown, Mr. Boyd the proprietor, who possessed talents and enterprise equal to arduous undertakings, having sunk shafts to a bed of coal under the level of the sea, conducted a stream from a distant river along the precipice, which rises from the shore, where by means of machinery he was able, cheaply and effectually, to keep his submarine pits clear from water; but this work has long since been abandoned. The levels, which are now the only mode by which the coal is extracted, are about four feet wide by four and a half feet in height, and are cut at the expence of from one guinea to one

one guinea and a half per yard, running measure. In this estimate are included the clearing away the rubbish, which is generally thrown into the sea, and the gunpowder which is used in blasting, which on an average is computed at three pounds weight per yard.

The produce and consequent value of the different mines vary considerably, according to the quantity of slack they contain. Blazing coal is sold for ten shillings per ton, and the blind coal for thirteen shillings. A ton of the former weighs 23 cwt. The slack is sold for five shillings English per ton, and is generally used for burning lime. All the coal is sold by measure. A ton of coal contains four trams of two barrels each. A barrel contains four bushels; consequently there are thirty two bushels in a ton of coals, as sold from the bank.

At present there are about one hundred men daily employed in different departments about the colliery. The earnings of labourers and of artificers are from 1s. to 1s. 7d. per day, and the weekly expenditure is from 30 to 40 pounds.

Those employed in cutting the coals are paid by the piece, and the prices vary from 4s. to 6s. 6d. per ton, according to the difficulty of the work, and the length of conveyance from the different chambers to the mouth of the pit. The coals are
taken

taken from thence to the store by labourers employed for that purpose.

The workman's measure to his employer is a third more than what is given to the buyer; as a ton of pit measure, (as it is called) consists of six trams, or twelve barrels, which is supposed to cover incidental losses and expences. In the catalogue of the chief ones are the quantity of slack, that remains after selling the round coal, and the great depredations frequently committed by the sea on the different banks. In the present state of the works there are from 60 to 120 tons of coals (pit measure) turned out every fortnight, and from 10 to 30 trams of slack. On an average it is computed, that three men, viz. one cutter, one bearer, and one trammer, can turn out one ton of coals per day. The country consumption is from 20 to 50 tons per week; sometimes 200 car-loads of two barrels each, have been taken away in that period. They are carried to Ballymena, and not unfrequently to Antrim; but their principal market is Coleraine, about sixteen miles from the colliery, where they are sold from 6s. 6d. to 9s. 9d. per load, or from 26s. to 39s. per ton. The quantity exported is not so great as might be expected, owing to the supposed danger, that vessels are liable to when off the colliery shore. But the risk is not so great, when one boat can ship

thirty

thirty tons in one day, and where a vessel of 200 tons could be loaded in two days.

No charge is made for shipping, although to the proprietors the expence is more than one shilling per ton for doing so. The men employed in this operation receive sixpence per ton; this, added to the expence of boats and stages, will amount to something considerable, and, from the encreased prices of timber, is of late much enhanced. The consumption of iron and wood varies at different times, but it has been estimated at 200*l.* annually. * The expence of candles alone is about 100*l.* but this is defrayed by the workmen, who likewise furnish themselves with tools, that are repaired at the expence of the company; but, on the opening of a new mine, a complete set of tools is provided for the undertakers of the work. The colliers are rather a lazy and indolent denomination of people; they work only from six to eight hours in the day time, and, when they calculate that they have earned from a shilling to eighteen pence for their day, they are satisfied, and retire to idleness or amusement.

The Ballycastle collieries have certainly been worked at a very remote period; for the miners in pushing forward to the bed of coal about the year 1770, at

* From the great rise in timber, &c. it must at present be more than that sum.

1770, at an unexplored part of the cliff, unexpectedly broke through the rock into a narrow passage so much choaked up, as rendered it impossible for any of the workmen to force through to examine it further; two boys were therefore sent in with candles for the purpose of exploring, but having penetrated into a kind of labyrinth, and their lights being extinguished, their voices also being exhausted with frequent calling, they would in all probability have been lost, if it had not occurred to one of them that, as the hammers of miners are often heard at a distance, they might make themselves heard by knocking with stones against the sides of the cavern; this expedient fortunately for them succeeded, and they were taken out after being in this perilous situation.

This cavern was found to be a complete gallery, which had been driven forward many hundred yards to the bed of coal, branching into numerous chambers, which were dressed in a workmanlike manner; in reality it was found to be an extensive mine, wrought by people expert in the business; remains of tools and baskets were discovered, but in such a decayed state that, on being touched, they immediately crumbled to pieces. The implements discovered were of a different construction from those of the present day; and candles, whose wicks were

formed of rags, or shreds of linen, were amongst the articles that were found.

Another proof of the earliness of the period, at which coal mines were worked on this coast, arises from the circumstance of coal cinders being still visible in the lime used in the building of Bruce's castle in the island of Raghery, the antiquity of which building cannot be less than 500 years; it may indeed, according to Doctor Hamilton, be more, as the time, which Robert Bruce spent in this island, was scarcely sufficient for the purpose of erecting it. But by whom these mines were originally worked, there does not remain any tradition.

Previous to the year 1736 they were occupied by a company mostly composed of Englishmen. In that year Alexander, Earl of Antrim, granted them in perpetuity to Hugh Boyd, Esq. of Ballycastle, great grandfather of the present Mr. Boyd; the grant conveys all coals, pits, mines, &c. &c. &c. from the church of Bonamargy, on the west, to the hill called the Fair Head, eastward, and from the sea coast three miles into the country southward—the only rent paid is the twelfth ton of coal at the mouths of the different pits; the banking, shipping, &c. is a charge to be deducted from the chief rent; this amounts to 2s. 8d. for each ton, common measure. It may not be amiss here

to

to mention, that pit measure is one-half more than common measure; and that, in the year 1805, the quantity raised was 2791 tons, the total expence of which amounted to the sum of 1976*l.* 4*s.* 3*d**h.* Mr. Boyd, being fully sensible of the great advantages to be derived from an extensive distribution of the produce of the collieries, not only to himself, but to the public, turned his mind towards rendering the bay of Ballycastle useful to his purposes. From its situation, and the circumstances attendant on that situation, (for it is exposed to the north-west winds, which, meeting the island of Rathlin in their way, drive in between that island and the main land a most tremendous sea,) it does not offer a safe retreat for vessels, except for a very short portion of the year; therefore it was necessary, that a quay or pier should be constructed, as a remedy for this evil. Different parliamentary grants were accordingly obtained, amounting to above 23,000*l.** and a quay was built; but whether the situation was injudiciously chosen, and the work not so skilfully planned and executed as the works of the present time, or that the force of the swell was irresistible, the sea overpowered it, having first filled the little harbour with sand, so as to render it nearly

* These grants were 5000*l.* 2*d* of George the 2*d.* Same sum 13*th* —10,290*l.* 19*th*, and 3000*l.* 3*d* of George the 3*d.*

nearly useless. To remedy this misfortune, I have heard that the river, which runs into the bay a little to the eastward of it, was turned in, under the idea of clearing away the sand; but this completed its ruin, and in that state it now remains.

It is therefore a matter of great regret that this place, the neighbourhood of which, in addition to its collieries, abounds with so many valuable materials, should be deprived of the advantages of a port. Great skill and considerable expense would certainly be requisite to accomplish this object, but every branch of the science of engineering is now so well understood, that without doubt it might be successfully undertaken. The other materials found in the vicinity of Ballycastle are clays of the most valuable kinds; one species obtained near the Fair Head has upon trial proved to be of that description, which is employed in the manufacture of the finest earthen ware, and is said to possess the qualities of the kaolin, which enters into the composition of china; whilst the granite, which is found in Ballypatrick mountain, resembles the petunse, also a component part of the same ware, and which abounds in the limestone flints. Excellent potter's clay, and clay for bricks, also abound, and fire-stones of the most lasting kinds. Sand for manufacturing glass is in large quantities, and kelp employed in making the coarser glass.

A glass

A glass house had been built many years ago, but the business is now given up. Manganese has been discovered, but the quality of it is inferior to that imported from England. To these may be added the freestone in all the extent of the colliery shore, the excellent quality of which must be evident from the scythe stones so much valued over the whole county. Many other substances, useful when accompanied with abundance of fuel, might probably be added to those rendered valuable by being near it; but sufficient has already been said to draw attention to those, that are known. I shall therefore close this subject with a view of the different strata, that accompany the collieries of Ballycastle, taken from Letters on the coast of Antrim published in the year 1790.

As it may be a matter of curiosity, as well as of utility, to have the means of comparing the strata of Ballycastle with those of other collieries in distant parts of the kingdom, I shall here insert Doctor Hamilton's account of them.

Ballycastle

Ballycastle strata, above, and under the present working coal, at Gobb mine, by John Evans, miner.

	Yds.	Ft.	
Whin-stone -	20	— 0	This is the same stone as the basalt of Fair Head and is imperfectly columnar.
Flinting slate -	8	— 0	
Yellow freestone -	14	— 0	
Slate and coal -	7	— 0	
Hard grey freestone	30	— 0	
Present working coal	1	— 2	
Slate the seat of the coal -	0	— 2	
Coal -	0	— 2	
Bording and slate -	6	— 0	
White freestone -	12	— 0	
Coal and slate -	1	— 0	
Grey freestone -	12	— 0	
Shivery freestone	7	— 0	Thus far the disposition and thickness of the strata appears to be marked with tolerable exactness so far as may be judged by looking at the face of the precipice. It is difficult to observe, with accuracy, the lower strata, because of the rubbish, covered with an imperfect vegetation towards the base of the cliff.
Slate -	0	— 2	
Yellow freestone -	10	— 0	
White limestone -	1	— 2	Greyish limestone, abounding in marine shells, occurs hereabouts.

Coal

	Yds.	Ft.	
Coal - -	0	—	1½
White freestone -	3	—	0
Blue bind -	1	—	2
Sandstone bind -	1	—	2
Main coal covered by			
the sea. -	6	—	0
			This is not known to the present workmen.
<hr/>			
Total	145 yards.		

Fossil Wood, or Wood Coal.

This fossil is not confined to one portion of the county; but in the northern parts, near the sea-coast, the circumstances, under which it is found, present very curious subjects of speculation to the geologist. I cannot describe them better than by giving the words of a letter from the Rev. Robert Trail, on the subject, to the author of this. "In most places, where I have observed this substance, columns of basalt are placed over it. In my own quarry on the glebe it is to be found underneath twenty feet of solid rock, in a compressed state, or flattened appearance; the outward edges, however, have preserved, in many instances, a degree of roundness, and I have heard of some pieces being got perfectly round as in their original shape. The bark and knots are quite distinct, and you may reckon

reckon the rings of its annual growth. I have even seen the roots of the trees, and distinctly traced the ramifications, where they were not covered with basalt, and could readily perceive that they had been laid down by some force pressing against them, precisely like trees blown down by a storm. These roots were visible on the west side, and the trees must have fallen with their heads towards the east. I can also relate with tolerable certainty, that all this substance has been fir trees; there may be some of a different species, because, where the weight has been greater, the substance becomes harder, and more nearly resembling * coal, and of course not to be so accurately distinguished. In this country it is known by the name of wooden coal, and, when other fuel cannot be had, it proves a useful substitute. For an entire winter I used it; the smell is unpleasant, nearly resembling that, which arises from the burning of a rotten stick. It is also used in burning lime, but from the quantity of ashes, which mix with the lime, it makes bad mortar, though good manure. It was first brought into notice by Mr. Alexander Stewart, about sixty years ago, who had been informed that the appearance of it indicated good coal beneath.

After

* It will not answer for the forge, as it will neither bear the bellows nor stirring.

After many trials, however, no other species was found. Some search having been made at a place called Killymorris, near the centre of the county, in consequence of the appearance of this wooden coal, was so far unsuccessful that no other kind was found. I have to add, that it was first discovered in the face of the hill above Ballintoy, and, from its having been found useful, attempts were successfully made to find it elsewhere; but I have not heard of any being found to the east of Ballintoy town. On the west side, however, particularly in the townland of Limineagh, it is got in great abundance. Unfortunately, both there and in Ballintoy, the pits happened to take fire, and the latter place continued burning for several years. Various attempts were made to extinguish it, but all proved fruitless; and finally it was smothered by the falling in of the superincumbent mass. This fossil wood is generally found in veins; where these are of the least thickness, the appearance of the wood is most distinct. These veins are from two inches to four or five feet thick, and universally run from east to west." On the eastern shore of Lough Neagh it has also been met with; near Portmore in large masses: it is there known by the name of Black wood; two beds, each twenty-five

five feet thick, and a third stratum nine feet thick, at the depth of eighty yards; and eighteen inches more were penetrated in the fourth stratum, but, not having sufficient length of rods, it was given up. Also, between Ballinderry and Crumlin, on the same shore, Mr. French was at great expense on the first stratum, which was thirty inches thick at the end of the level or drive.* The resemblance between this wood coal and Tuturbrand mentioned in "Letters on Iceland," seems to be so very great, as to induce a conclusion that they are similar substances, and have been produced by the same cause†. But this must not be confounded with those thin strata, that are dug up very near the surface in many places on the Lough Neagh shores; these latter strata, lie so near the surface, as to be met with in shallow cuts made for watering meadows, as I saw in Mr. Whittle's land between Glenavy and Crumlin: what was thrown up there was wood

* Donald Stewart's Report.

† A remarkably curious circumstance has lately been observed at Bengore Head, respecting this fossil wood; a considerable stratum is found between two rows of pillars. This discovery, I have heard, was made by the person, who shews to the curious the most striking features of that head-land, under the auspices of Dr. Richardson. It is in a place very difficult of access, but the fact, I believe, is so.—What an exhaustless source of speculation and conjecture does this furnish to geologists?

wood, in a state of decay, with no other resemblance to coal than in the colour; whereas the other, from its weight, appearance, and feel, seems to hold an intermediate place between wood and coal; and, notwithstanding the burning qualities of it may not be such as could be wished for, when the bogs are more exhausted it may become a valuable substitute.

Sandstone.

Sandstones of different colours, different degrees of hardness, and differing in the size of the grains which enter into their composition, form the grand basis of this county. They appear at the southern extremity of it near Spencer's bridge, where it joins the county of Down. From thence they may be traced along the whole valley to Belfast, and along the shore to Carrickfergus, a tract of not less than twenty-two miles. It occurs again between Broughshane, and Clough near the centre of the county, and at Ballycastle, the northern extremity; also, in the island of Rathfriland; but in these last mentioned places, where it alternates with strata of coal, it seems to have left its humble situation, and in elevation rivals the basaltic precipices,
which

which it joins. At the bottom of the mountain, between Ballycastle and Newtownglens, sandstone of a red colour forms the paste, in which numerous rounded pebbles are imbedded; some of the pebbles are white, some are brown, and many of the colour of the paste. This stone is of peculiar hardness, and seems confined to this track; the pebbles are of the siliceous kind, and the whole forms a species of pudding-stone, which is seen more plainly in the great cave near the sea-shore at Cushendun, where the whole mass is connected together as hard as any rock, the cliffs above it being of the same composition, and extending to Red bay. The depth, to which the sandstones go, is very great, and quite uncertain; this has been tried in many places near Lisburn, where, after boring near two hundred feet, the undertaking has been abandoned; and at the freestone quarry at Scraba, in the county of Down, 450 feet have been bored through without success. The other aggregate stones are granite and gneiss: these are found very near each other on the mountain above Cushendun, the first appearing from under the boggy banks of a branch of the Cary river, on the right hand of the road from Ballycastle. This is a very large-grained red granite, hard, and the component parts distinct and clear: much of it
could

could not be seen, but sufficient to shew that it was not a single stone, but that there was a mass of it together. At a little distance on the same side the gniess began to shew itself, where the covering of bog was slight, and continued from thence to the bottom of the mountain at Cushendun. The enormous fractured mass of this substance, which hangs over the road on the left, and the disjointed fragments that lie under it on the right, as the hill is descended, cannot fail of striking the beholder with awe, nor of bringing to his imagination the horrid convulsion, that must have taken place at the moment this compact mass was torn from its foundation, and scattered in gigantic fragments below.

As this is the only situation, where I have observed these fossils, in the county, I shall describe its boundaries so far as I saw them. After the valley is passed between Ballycastle and this mountain, you ascend for some time, with the limestone at a distance on the north, the basalt country on the south; the limestone then approaches the road to the north-east, rising from the turf-bogs; on the other side all is covered by it, and in a little space the limestone vanishes also under the bog; when the bridge appears, the granite is seen in the bed of the river to the south-west; the gniess then

suc-

succeeds, and continues as far as the foot of the mountain on the other side, where it is bounded by the red sandstone of the same composition as that, which forms the sides and roof of the cave at Cushendun.

Siliceous.

The siliceous petrifications of Lough Neagh, with the pebbles found on its shore, will be mentioned when we come to speak of that water, and the flints, that accompany the limestone, will be spoken of; it now remains to notice the other stones of the same nature, which occur in this county, and the places in which they are found. Among these are crystals of superior hardness and transparency; one of these is mentioned by Mr. Barton; it was obtained from a countryman at Knocklade, and weighed thirty pounds. Though purchased at first for a trifle, it afterwards sold for a high price in London. Another one, that I have seen in the possession of Mr. Barton's sister, cut into the shape and size of the famous Pitt diamond, is a most beautiful stone, both for lustre and hardness. These I particularise as remarkable; but many fine specimens are picked up, in breaking

ing stones for different purposes; for they abound in basaltic countries, many of them being also found in the island of Staffa.

Calcedony is found near Belfast, in thin layers between the strata of basalt; they exist likewise in other forms in many situations, but they abound near the Causeway, where they are taken out of the soft rocks used for making the roads.—

A few years ago I got some very fine specimens there from the persons, who had picked them up, and had them for sale. Agates* and red-coloured flints of peculiar hardness may be added to the catalogue, the latter in the lime quarries that are cut by whyn-dykes; they make the most lasting gun flints, striking out a great number of sparks at every collision. Among the flints there are marine exuviae completely saturated with siliceous matter, and preserving in a perfect manner their original form; of these the echinus is very curious, every projection of the shell being still as visible as in the living animal. Specimens of the purest zeolite are often exhibited among the basaltic rocks, and of a great size, beautifully striated

* Very fine agates have been found at Megaberry, four miles south of Lisburn.

ated, and white as snow. To a person, who wished to form a cabinet of the productions of a basaltic and limestone country, I suppose there is not a tract on the globe, that could afford a more interesting, or a more varied collection of the fossils contained in such a country, than the basalts and limestone area of the counties of Antrim and Derry.*

SECT. 4. *Waters.*

Lough Neagh.

The situation, extent, and natural productions of Lough Neagh are such as to claim particular attention in the Report of Antrim. It lies not far from the centre of the province of Ulster, surrounded by five of its most populous and trading counties, Antrim to the north and east, a small portion of Down also in the latter direction, Armagh to the south, Tyrone to the west, and Londonderry to the west and north. Between these counties it forms a ready communication, and, by means of the Belfast and Newry canals, foreign importations are distributed over the adjacent country; and the produce of the Tyrone collieries is also

* Sandy bex, or pitchstone, is found in a hill called Sandy Brae hill, between Doagh and Connor. *Mr. Templeton.*

also accessible, by its means, through the canal which is made into the Blackwater from Coal Island.

Its extent from Toome, north-west, to Kinnigogut, is fifteen Irish, or nineteen English miles and six furlongs; its north-east and south-west extent from Shane's Castle to Black-water, nearly the same; from east to west, the extent is about nine miles and three furlongs, Irish measure, or eleven miles, seven furlongs and a half, English. Its greatest meridional length is from Toome to Derryenver twelve Irish miles and four furlongs, or fifteen English miles, seven furlongs and a half. Its shortest distance across from Arboe to Gartree point is six Irish, or seven English miles and five furlongs. The superficial contents, as taken at the ordinary height of the water, are 60,361 Irish, or 97,775 English acres, which are equal to, or rather more than ninety-four Irish square miles and a half; the circumference is sixty-three miles and four furlongs Irish measure, equal to eighty miles, six furlongs and a half, English. The greatest depth of water, taken in August 1785, was forty-five feet, and lies between Arboe and Gartree points, nearly in the centre. The waters grow shallower as the
shores

shores on both sides are approached, but many parts, notwithstanding, afford unloading places, where vessels can come in.

At the time the depths were taken, the lake had been lower than for many previous years, but the general difference between the ordinary heights of the water in winter and in summer may be stated at five feet, six inches, when the lake is settled, although it has been known to have risen seven feet higher than it was in the summer of 1785. At Shane's Castle it once rose seven feet, nine inches, with an in-blowing wind. The great rising of the waters after very rainy winters and springs, unfavourable to evaporation, gave birth to a publication from Francis Hutcheson, then Lord Bishop of Down and Connor, printed in 1738, in which he says ; " the overflowing of the lake is owing to the influx of the many rivers, which discharge themselves into Lough Neagh, besides innumerable streams ; for all the chief rivers of the five counties, which border upon it, have descending courses from the opposite seas, mountains, and marshes, until they meet in this centre, from which they have no visible outlet, but one narrow and obstructed passage of the Lower Bann, which, besides all the encreasing obstructions of its own channel, from its sands, rocks, and other accumulations,

lations, has others raised by art for the purpose of the eel fisheries." His lordship continues, "that the waters, which flow from so many courses, could not be discharged by the single outlet of the Bann, but must, without steps are taken to assist the discharge of the waters by clearing the obstructions of the river, be annually accumulated, to the great detriment of the lands around." The bishop mentions one church, that of Ballyscullen, not only encompassed by it, but that a great part of the parish had been drowned; that great tracts of rich land, once adorned with trees, were covered; and that a fisherman, having twice removed his habitation, was about to do so again, complaining, that he knew not where to set it, for the Bann followed him." Though the encroachments of Lough Neagh do not seem to have kept pace with the apprehensions of the bishop, nor with the fears of the fisherman, yet it is very certain that great inconvenience, and often serious losses are sustained from its overflowing, sometimes early in autumn, and always in the winter season, though in summer it usually returns to its level; for most of the streams, which usually flow into it, are at that period nearly dry, and all of them discharging a lesser quantity of water into the lake, whilst the

Lower

Lower Bann, its outlet, must carry off an equal quantity, when the water is above a certain height, and continue so to do until it subsides to a level with the rock, which forms the main obstacle. This discharge must then, in a few months of dry weather, reduce the lake to its summer standard.

Though it seems evident from these considerations, that the waters, accumulated during the winter, are discharged in the course of the summer, unless a very wet one, still it would be a most desirable circumstance, if they could be lowered so as to prevent them, in winter, from lying too long on the overflowed parts, as they destroy all vegetation, except of the coarser aquatic vegetables; for the destructive effect of its waters rather proceeds from the time they continue on the land, and their depth when on, than from any deleterious quality they possess.

Therefore even to reduce the body of the water during the summer season, so that the bason of the lake would have capacity to hold a great part of the winter floods, without rising above the present summer level, and by that means to prevent the usual accumulation of winter, would be a great object to land-holders, whose properties border upon it, if their mutual claims would be ascertained and adjusted;

justed; and this project, which, if once carried into execution, would be so very beneficial, does not seem unfeasible: for according to a survey made some years ago, by order of the late Lord O'Neil, Mr. Owens, (who completed the Belfast canal from Lishurn to Lough Neagh) found, that from Toome to Lough Beg there is a fall of fifteen inches; that to make a wide cut on the Antrim side of the Bann, to commence or be taken from Brockish bay, into Lough Beg, such a cut with the bridges would probably cost 10,000*l*. Now, when it is taken into consideration, that Lough Neagh contains more than 60,000 Irish acres, and that its shores are very shallow, and that the thirteen rivers which run into it, besides the rivulets, are all dammed up by the height of the rock at Toome over the extensive flats, which surround it; and when it is further considered, what an immense body of water 15 inches taken from its surface is equal to, or rather how much ground that water now covers; it seems really to be an object every way worthy not only of private but of national interference. For, let it be supposed that fifteen inches are taken from the depth, this is the 36th part of the whole, which is forty-five feet: of course then this diminution of the water uncovers 1666 acres, being the same proportion to the whole depth; but then the internal
form

form of the lake having more resemblance to the shape of a dish, shallow at the edges, than to a bason, which has a more abrupt descent, from that circumstance a much greater surface of land would be uncovered than the mere proportion; probably not less than three or four times the quantity of acres, which at 10,000*l.* would be a cheap purchase. The obstacles, which are in the way of an attempt to a more effectual draining of this lough, are of a nature much more difficult to overcome, as will appear from the following statement, also by Mr. Owens. "From Lough Beg to Portna, on the river Bann, is about thirteen English miles, the whole of which course would require to be widened to a great extent, to receive and to give vent to the water; at Portna there is a fall of eighteen feet six inches, with a bottom of solid rock, which must be raised; and an attempt to widen the river at this place would be attended with the most serious obstructions, as the sides of the river are here bordered with high and steep precipices composed of solid rock, that come bluff home to the very edge of the water for six hundred yards in length; I am therefore decidedly of opinion that, if one hundred thousand pounds were expended in attempting even a partial draining of Lough Neagh, it would not be compleatly done.

done." The difficulties stated above are certainly such as to require every consideration, before an attempt is made to remove them; but still, if success was to attend the attempt, all claims upon the recovered land being adjusted, and all rights being ascertained, and, where they were infringed, being compensated, the sum mentioned would be well disposed of in effecting such a work; but in addition to this work itself consideration must be given to other circumstances: such as the probable injury the Belfast, the Newry, and Coal island canals would sustain by so great a diminution of the waters; the destruction that might ensue to the fisheries, and many other matters of minor importance; and to these must be added the expense of making the cut, from Brockish bay into Lough Beg, equal in depth to that of Portna. Should this undertaking ever be in serious contemplation, no doubt every attention will be paid not only to the advantages, but to the disadvantages that are likely to follow; this is the only fair way of calculating, as it shews on which side the balance is likely to lie. But the total draining of the lake is impracticable, as the fall from thence to the sea is only forty-two feet, and a great part of it is forty-five feet deep in the driest season.

The islands in Lough Neagh are few in number,
and

and add little to its beauty, being low and without wood. Rams island is remarkable for its round tower, which is conspicuous along the whole eastern coast. Cunny island on the Armagh shore, and those small islands, which lie off the point in the parish of Duneane, are all it has to boast of.

Lough Beg, which intervenes between the great lough and the Bann, would be reckoned a large, not a small piece of water, as its name implies, was it not in the neighbourhood of the other; it is about three miles in length from north to south, by one and a half in breadth; it contains four islands, in one of which are the remains of a church, on which the late Lord Bristol, bishop of Derry, built a handsome spire, which is a good relief to the prospects of the country around it. Into this lake, which is fifteen inches lower than the great lake, the cut is proposed to be taken for the first lowering of it.

Some Account of the Natural History of Lough Neagh.

Though the subjects of natural history, which Lough Neagh produces, are not numerous, those which it does produce, are worthy of particular notice; its petrifications have been long celebrated,

as

as well as the beautiful pebbles found amongst its sands. The fish, whether those that are permanent, or those which periodically resort to it, are objects deserving attention, and it may not be uninteresting to have a catalogue of the birds, which live in its vicinity, or only stop there in their different migrations. Of petrifications the most numerous class is composed of portions of trees, sometimes of the stems, but oftener of the roots, which to the eye appear in their natural state; but upon being examined they are found to consist, some entirely of stone, and others only partially so; these substances are of different magnitudes, some as heavy as many hundreds in weight, and others much smaller; in many instances holly appears to have been the basis of this transformation; but the greater part of those, which have come under my observation, have more the appearance of oak, and at first sight bear a strong resemblance to the remains of that wood so frequently dug out of turf bogs. This petrifying quality of Lough Neagh, or of the soil around and under it, has been long known, but the difficulty of accounting for it has long been the cause of doubting its existence entirely, supposing that nature had formed these stony substances so strongly resembling wood, as they now are, and that no change had been under-

gone ; but when we come to consider how the petrifying process may have been accomplished, and that wood is capable of undergoing it, and then examine the specimens, little doubt can be entertained of its reality. Petrification is defined to be a slow operation of nature, carried on in the bosom of the earth, or in the waters, which changes into stone bodies found there, and which belong to the animal or vegetable kingdoms. Wood is a substance capable of undergoing this process of petrification ; it is composed of an earth, of water, of a gum, or resin, and of a salt. Its organization consists of an assemblage of fibres, and of tubes, which give a passage to the sap ; of vesicles and of pores, which run from the centre to the circumference ; therefore when a piece of wood is buried in the earth, it is soon penetrated with water, which by degrees dissolves the soluble parts, as the salts and resin. Here the decomposition commences ; by degrees, the tubes and pores being enlarged, water enters into them as into a sponge ; the wood nevertheless retains its external form, and internal structure, by means of the earthy parts which are its basis, and which form the skeleton of the vegetable. The water thus entering the enlarged vessels insensibly deposits there its earthy or stony particles, with which it may be more or less impregnated ;
these

these combining with the earth, which enters into the composition of the wood, insinuate themselves into the vessels and the pores, unite with and harden into each other. By this union (the soluble parts being carried away and the earthy basis remaining) what was wood becomes stone, preserving its original exterior and interior form, and according to the nature of the adventitious parts, which predominate in this new combination, become either calcareous, argillaceous, or siliceous, to which last species the Lough Neagh specimens belong. Thus the saline and resinous parts of the wood are carried off, but not changed into stone; their place is merely supplied by the adventitious matter, which with the earth still remaining forms one mass; properly speaking, therefore, petrification is not transmutation, it is a substitution, an addition, and a new combination. That the substance now in question was wood at some period is evident from inspection alone, even in those masses where the process has been completed. The bark, the form, the grain, the spreading out of the fibres towards the roots, all attest it; but when those specimens are examined, in which the petrification has partially taken place, the fact is established beyond all doubt; for many of these are externally wood, internally stone, and vice versa, often having the longitudinal
fibres

fibres in direct continuation, partly wood and partly stone, where the fibrous woody substance is joined to, and forms one continued piece with the stone; so that in the length of the specimen there is united the solid stone, and the brittle wood, in which the operation has not taken effect, probably from its having been too soon disturbed, and too soon admitted to the free air; for this process seems to exclude it to a certain degree at least, as it is well known that bodies exposed rot, but do not petrify. If any other proof was required to strengthen the above, and to shew that the unpetrified parts are real wood, the result of a chymical analysis, shewing the residuum in both to be the same might be adduced; the experiment was tried, and proved conclusive. This petrifying quality has generally been attributed to the waters of Lough Neagh, but it seems rather to exist in the soil; for if it was possessed by the water, why should it be confined to a small space of the eastern shore? Besides, if it was these waters, which produced the effect, why should it occur, where they cannot reach? as it does high up in the river of Crumlin; and in the grounds elevated far above their surface, and at a distance from them. The opinion, that the lake has been the agent in this operation, has naturally arisen from the number of specimens found in it; but

but when their situation is considered, this agency is doubtful, even respecting them; for all have been obtained either by sinking for them, or they were so placed, that it is evident they must have been covered by the earth at one time, and this covering of such a nature (stiff clay) that the water could not penetrate it.* As therefore this quality is not general in the lough, and as it exists elsewhere and in its neighbourhood, but at an elevation to which it could not reach, and under it, yet at a depth to which it could not penetrate, it follows that the lake is not the theatre of this operation, but that it takes place in the soil.†

Petrified substances of natures totally different from these, and the apparent produce of tropical climates, have been thrown up by this lake at different times; those, which are called petrified rushes, are masses of coralites, and those, which are supposed

* It is well known that surface water penetrates, generally speaking, but a very short way into the sub-soil, especially if it is of a clayey nature.

† I shall describe the situation of this bed of petrification here, as it might have embarrassed the detail by being introduced in it. It lies near the mouth of Glenavy river, at a place called by Mr. Barton, Aheness. A bed of blue clay four feet deep is next the wood, above that a bed of red clay three feet deep; these two strata have evidently been covered by a bank of twelve feet, that has been washed away by the encroachments of the lake, so that, in the whole, this collection of petrification had been covered to a depth of nineteen feet.

supposed from their construction to have been honeycombs, are substances of like nature but different in form. Hazle nuts have been found also; one of these, which I have seen, affords a most curious specimen; being open at the small end, it shews the kernel a compleat siliceous petrification; part but not the whole of the shell is affected in the same way; the kernel has been enlarged, either by the moisture in the first instance, or by the adventitious matter, so that it projects a little beyond the lips of the shell, and shews itself a little beyond it. *

Much has been said of the time, in which this curious natural process has been performed; of the period it takes nothing satisfactory has ever been offered, so far as I have heard; it appears to have been the work of an indefinite time.

The Lough Neagh pebbles are all of the siliceous genus. They are either calcedony, which is met with in rounded masses, some of near a pound weight, or in flat pieces, resembling parts of the thin strata found between the divisions of basalt in the quarries to the north of Belfast: the sharp edges of these are worn off by the motion of the waters, and in many instances they have the appearance of having been in a soft state, so as to retain

* This is in the possession of the Rev. Patrick Johnston.

retain the impression of the bodies, between which they have lain. These stones are mostly of a pale yellow, and take a fine polish, and bear cutting well. The number of those stones, which are entirely red, or that have red veins passing through, is greater than of the other. They are procured on the sandy beach, from the size of a pea to that of an egg; they take a fine polish, and are much esteemed for seals, necklaces, and bracelets. Though they are daily gathered by the inhabitants on the shore, every storm, by giving a new turn to the sands, exposes fresh ones to the sight. These people are very quick in distinguishing the most valuable kinds, which are the deep red, and the light-coloured with red veins. Many of the dark kinds have the solid rich appearance of agate; others have the dots, veins, and figures, with which these stones are ornamented, in a ground nearly transparent. The sands, where these are found, mostly consist of small fragments of siliceous matter, and, when mixed with their due proportion of lime, make a most durable cement; for by the frequent washing they are free from all earthy particles, which might interfere to prevent them coming in close contact with the lime, and in themselves are too hard to be affected by the weather.

It has been said that, besides the petrifying qualities of Lough Neagh, its waters possessed the power of healing sores, and of curing cutaneous disorders. Its appellation is alleged to have been derived from this circumstance; and the name of a young man, who was cured by bathing in it, is quoted as a proof in Boate's Natural History of Ireland. Upon analysis, however, its waters are not found to contain any thing different from the other waters, with which this kingdom abounds. The cleanliness, consequent upon bathing, might certainly have its effect in the latter case, and a miraculous cause attributed to a very common result. Whether more faith may be given to the account of the sudden formation of Lough Neagh, as mentioned in the History of the county of Down, I shall not presume to say; but a curious circumstance respecting this lake, which the writer heard from Lord Bristol, bishop of Derry, many years ago, on the subject is too remarkable to be omitted:—"In a monastery on the Continent a manuscript existed, which mentions, that in the sixth century a violent earthquake had thrown up the rock at Toome, which, by obstructing the discharge of the rivers, had formed this body of water, and that Lough Erne, in the county of Fermanagh, was produced at the same time."—Mr. Lendrick

also

also mentioned that, in taking soundings in different places, he had encountered the *spright* stems of trees, and that particularly at the mouth of the Black Water they were numerous.

Fish of Lough Neagh.

Of the fish, which are found in Lough Neagh, some only visit it periodically, as the salmon (*salmo salar*), and the eel, (*muraena*.) Others are permanent inhabitants, as the *salmo lacustris* (buddagh), *salmo fario* (yellow trout) *salmo lavaretus* (pollan), *salmo Alpinus* (char), *Cyprianus brama* (breasm), *perca fluviatilis* (perch), and *esox lucius* (the pike). The roach is also said to be an inhabitant of this water, but I have not been able to ascertain the matter, having never seen any of them; if they do exist in it, they are a scarce fish.

The salmon, in their progress to Lough Neagh, make their appearance in the mouth of the Bann about March or April, sometimes sooner if the weather is fine, and return again, playing in the ebb. The full grown fish ascend the river about the 20th of April, or beginning of May; this is called the run of the fish, and continues until the end of the latter month. At this time the fishery is slackened, and not carried on so briskly as about mid-

summer; for then the graul, or young salmon, ascend, continuing to do so for several months. The Leap is situated in the river, about four miles from the sea, and a mile above the town of Coleraine, and is about twenty miles from Lough Neagh, so that the fish are obliged to ascend twenty-four miles, and overcome all the obstacles in their progress before they enter the lake, from whence they distribute themselves into numerous streams and rivers, which are discharged into it. To cross this lough, and obtain the shallows of the rivers, in many places is not less than the distance from the sea to it, so that fifty miles may be said to be traversed by these fish, from their leaving the sea until the time of spawning; for they are often taken in the branches of the Main Water, at a great distance from the lough, even above* Broughshane. That species, known as the common salmon, is the *salmo salar*; the eriox, also caught along with it, comes to be as large in size, and, as it is distinguished by its tail being more truncated, it is called by the fishers Round Tail. The salmon
spawns

* The voyage of our fish is trifling when compared with that accomplished by the salmon, that ascend the Rhine, which are taken above Basle, probably in their ascent to some of the numerous lakes of Switzerland.

spawns in clear shallow streams with gravelly bottoms, far from the mouths of rivers, in water from eighteen inches to four feet in depth, to obtain which they ascend, through the greatest difficulties, until they obtain their object; the females, always accompanied by the males, or milsters, make a hollow in the gravel; when this is done, they both hover over it, and, approaching each other with their bellies, the spawn and milt are ejected at the same time. When the spawn is lodged in the gravel, they unite their endeavours in covering it, forming elevated gravelly ridges from fifteen inches to three feet in length; this ridge is raised from three to five inches at the extremities to fourteen inches in the centre, tapering to the points. After this the fish return to the sea as soon as they are able, but in a lean and poor state. The spawn is generally deposited in October or November, and is probably vivified in February or March, and is then called fry. The salmon fry retire to the sea about the middle of June, or earlier, where they continue until August or September (though some of those first vivified appear sooner) and return to the river much increased in size, being in length from eleven to fifteen inches; they generally remain about the mouth of
the

the river, where they make but a short abode, returning to sea again. After passing the winter there, the young salmon come again to the river in March or April, considerably increased in size, and altered in its appearance; it is then a vigorous fish, from sixteen to twenty-four inches in length, and of a bright silver colour; it does not remain long at a time in the river, but passes irregularly from and to the sea, at different periods from March until the month of September, when it again retires to the sea for the winter, from whence it returns in the same months as above-mentioned; it is then so large as to be taken in the nets, and from its size, &c. is acknowledged as a young salmon.

Having completed the third year of its growth, it retires once more to the sea, and from thence returns to the river a full-grown fish. After having spent most part of the summer in the river and lake, it ascends in September and October to the smaller and more remote rivalets, where, favoured with shallow water and a gravelly bottom, it deposits its spawn in the manner above described. The salmon is known to be attached to its native river; the experiment of making them to ascertain the fact has more than once been tried with success. This fish, in coming from the sea, is found
to

to have lice attached to it, which in a short time drop off, and die in the fresh water.

Another circumstance is also noticed respecting it; that a few of the mother fish are supposed to remain in the rivers to direct the young ones to the sea.

For the particulars of the fishery, belonging to the county of Derry, I refer the reader to the Survey of that county; I shall only add from that authority, that the rent paid to the Society is something above £900 per annum; the expense of management from £1000 to £1500; that in one year 250 tons of fish were taken and salted, besides what was sold fresh, and that the least quantity known any year was forty-five tons.

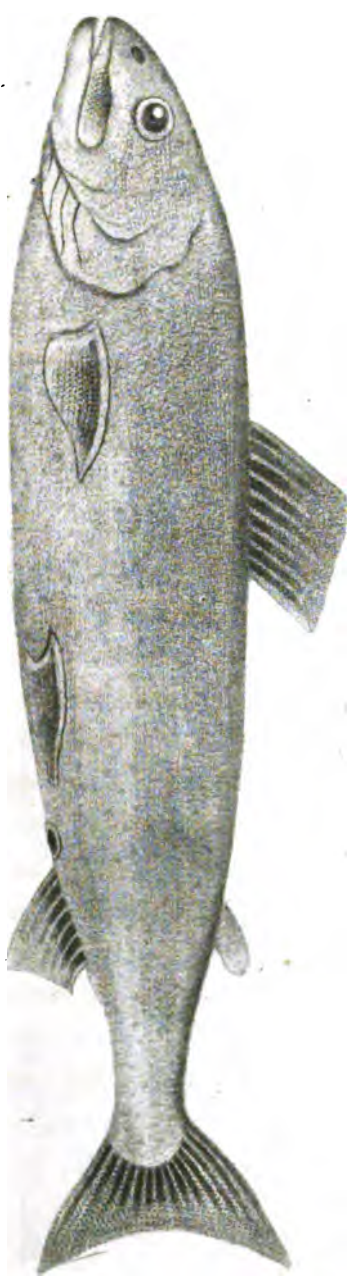
Salmo lacustris (buddagh) spawns in gravelly bottoms about the beginning of November, follows and preys upon the pollan; they are taken in nets in all parts of the lake, during spring and summer; they weigh sometimes as much as twenty pounds; from eight to ten pounds weight is common. They are not reckoned so delicate a fish as that, which follows:

Salmo fario—common yellow trout with red spots—spawn about the same time as the above-mentioned, and in the same kind of bottom; found in

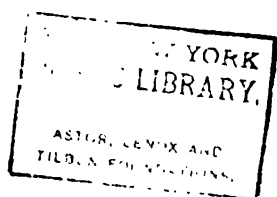
in all parts of the lake, but it likes hard ground and sand; this species weighs from one pound to six pounds.

Salmo lavaretus (pollan) spawn in stony bottoms in December; after spawning it goes to the mud to recover; it is in season early in the spring, from that until the end of summer caught very much on the sands during that time. The pollan is a gregarious fish; it approaches the shores in vast numbers in the spring and summer. It is reckoned an insipid fish, and does not keep well. This species weighs from half a pound to a pound and a half, and is a great article of food about the lough, and in the towns of its vicinity. The price from six pence to ten pence per dozen. This fish has been supposed to be peculiar to this water, but it is found in many parts of Europe.

Salmo Alpinus (char). The idea of the existence of the fish in Lough Neagh having been much combated, and not thinking myself sufficiently qualified as a naturalist to support the opinion that it does exist there, of which I am persuaded from every circumstance, that inquiry has brought to me, I had requested Mr. Templeton of Orangegroove to put together the result of his observations and inquiries upon the subject; accordingly I am
furnished



Salmo Albus, or Trout.



furnished by that skilful naturalist with the following letter, which I lay before the reader :

“ Dear Sir,

“ In endeavouring to trace the history of our Lough whiting, I have been led to consider it of the same species as the *Salmo Alpinus* of Linnæus, and Charr of Winander Mere; the red char of Wales (*Salmo salvelinus* Don Bri. pl. 212) differing from the other in many particulars. The cold lakes of the north of Europe and Switzerland are the principal residence of the charr; they are also found in Lough Inch in Scotland, and are mentioned in Cambden's *Britannia** to be found in Lough Esk, near Townavilly, in the county of Donegall. Smith, in his *History of the county of Waterford*, mentions charr being caught of the extraordinary length of two feet, in two lakes on the Waterford mountains†. I have also seen our whiting, which were caught in Lough Egish in the county of Monaghan. Bloch‡ says that these fish spawn during eight days in February, that they dispose their eggs in a circular form, and
that

* Cambden's *Britannia*, Gough's ed. 3. 644.

† *History of Waterford*, 308.

‡ *Hist. Nat. des Poissons* 6. 100. Castel's ed.

that, when the fishermen observe those circles, they spread their nets to catch other fish, which resort to the place. Pennant says, § the gilt charr spawn from the beginning of January to the end of March, that they are never known to ascend the rivers, but remain in those parts of the lake, which are springy, and the bottom smooth and sandy; the fishermen judge of the places, where they spawn, by observing that the water never freezes there, except in the most intense frosts. He also says they are taken in the greatest plenty from the end of September to the end of November. If there was no other similitude between the charr of Winander Mere and the whiting of Lough Neagh, this exact agreement in their manners would lead us to conclude them very nearly allied. Our fish are also caught from the end of September to the end of November in nets along with pollans (*Salmo Wartmanni* of Bloch; *Gwiniad* of Pennant's *Brit. Zool.*) they are never known to take a bait; they always keep the deep water except in warm weather, when they are sometimes found in the shallow; the best time for taking them is in nights, that are calm, clear, and a little frosty; the capture of the pollans begins to fail generally sooner than that of the whiting.

The

§ *Brit. Zool.* 3. 269. 4to ed.—308, 8vo. ed.

OF THE COUNTY OF ANTRIM. 121

The whiting is generally about twelve inches long, though I have seen one of fifteen.

The nostrils double.

Teeth in the jaws, roof of the mouth, and on the tongue.

Back dusky brown, sides pale reddish brown with small spots of bright bay, belly white with a tinge of reddish.

First dorsal fin 11 rayed.

Second very small.

Pectoral 11 rayed } The first complete ray of
Ventral and anal 8 } each strong and white.

Tail with 10 complete rays, and somewhat forked.

The principal difference in this description from that of Pennant's gelt or gilt charr is in the colour; in his the back is described to be of a glossy dusky blue; the sides silvery, mixed with blue, spotted with pale red, sides of the belly pale red, the bottom white, and the tail bifurcated.* I have never seen our fish alive, so that its colours may resemble the English fish more nearly than I can now assert it to do; every one conversant with fish knows however, what an influence water has on their colours, the common trout being often found with its belly tinged of a deep orange. And the

R

learned

* Brit. Zool. 3. 311. 8vo ed.

learned ichthyologist Bloch says* that the colours change so much according to the quality of the waters (the clearer and colder, the firmer the flesh, and more lively the colours) that he thinks this fish, the Linnean character of which depends principally on the blue colour of the back and sides, varies so much as to lead him to consider his L. Omble (*Salmo salvelinus*) as the same species, and that the distinguishing character of these fish from the rest of the genus should be established on the first ray of the anal and ventral fins being strong and white, while the rest of the fin is red. This character is then equally conspicuous in his L. Omble (*Salmo salvelinus*) la truite des Alpes (*Salmo Alpinus*) charr of Pennant, and our Lough Neagh whiting.

Yours, &c.

Malone,

JOHN TEMPLETON."

March 19th, 1811.

Cyprianus brama (bream) spawn about Lammas, in reedy and boggy bottoms, very much in Portmore lough; caught in pools. Some of this species have weighed seven pounds; usual size from two to five pounds. Males in best season about the time of spawning, females in spring until May or June.

Perca

* Hist. Nat. des Poissons 6. 101, Casteln's ed.

Perca fluviatilis (perch). This fish was first put into Lough Neagh by the present Lord O'Neil's grandfather. How wonderful the increase, in a period, perhaps, not exceeding fifty years ! The perch spawns about the beginning of April, in the rivers ; in season all the winter and early in spring ; is caught on banks of sand or gravel, and often on the shores ; weight various according to the age, from a quarter of a pound to five pounds. The large perch are reckoned good, the small not much valued ; they are taken in wonderful quantities.

Esox lucius (pike) spawn in April or May, according to the warmth of the weather ; on boggy grounds, or in drains ; like muddy bottoms ; in highest season about February ; caught of all sizes from one to thirty pounds. This is an animal of a most voracious appetite, to gratify which the strength of its jaws, and the agility of its motions are admirably calculated. An instance of the voraciousness of this fish happened at Mr. Gorman's, of Broommount, too remarkable to be passed by : there were two pikes in a pond in his garden ; on going one day towards the pond with another gentleman, he perceived, as he thought, one of the pike floating on the surface, but on examination it proved to be both ; the larger being gorged with the former, only a few inches less than itself, and both dead.

Muræna

Muræna (eel). Lough Neagh is the great rendezvous of this fish, previous to its departure for the purpose of producing its offspring in the sea; for it is viviparous. To this water all the fish of this species, that ascend the river Bann in the spring, to distribute themselves in the rivers and lakes that have communication with it, return as soon as the autumnal rains enable them to accomplish their object, in which they are so persevering, that, when by dry weather, or any other circumstance, they are cut off from a conveyance by water, it is well known they will make their way, by crawling through the grass for a considerable distance (for the eel can live on land longer than any other fish) to make their passage good to the sea. It is in this passage, in the months of August and September,* that they are intercepted by nets fixed across the river. The growth of the eel is very quick; when they come up in spring, they are not thicker than a small packthread, and are assisted in their progress by ropes of hay or straw to ascend the rocky parts of the river; when they return, they are often many pounds weight, though their stay is only of a few months. If any of them remain behind, the
number

* Sometimes the run of the eel is much later, when the weather is very dry.

the number must be very small, as I cannot find an account of their being taken in winter, nor when they are with young.

Petromyzon (lamprey). Taken in the rivers, which ran into Lough Neagh, also at the cuts of the rocks, to which they attach themselves by suction. They are discovered and taken at low water with sharp iron hooks, fastened to a piece of wood, which are called loopers; they are a perquisite to the fishers, are reckoned a delicacy when fresh, and are potted to be sent to other countries.† They are not much valued as an article of food by the people, who have a dread of their unwholesomeness.

An idea of the value of the eel fishery may be formed from the rent, it having been let, about fourteen years ago, by Lord Donegall, for £400 per annum, and a fine of £1300.

To support the innumerable shoals of fry, every year produced from the fish here enumerated, nature has made an ample provision in the countless millions of flies (*Tipulæ*), that are annually generated upon the borders of the lough; these insects and their larvae afford them support, and are the cause of their resort to the shore in the spring months,

† Derry Survey.

months, being brought to life about the same time the ova of the fish become animated. Those, who have not frequented the neighbourhood of the lake in spring, will scarcely give credit, when told of the multitudes of these little creatures that hover in the air, sometimes much above, and sometimes at the very surface of the water, with the loud and never-ceasing trumpet-like sound, which is kept up by them. Some idea may be formed of their astonishing numbers, from seeing the quantity that at times are drowned ; when flying close to the waves, they are caught by their motion, and being afterwards washed on shore, and left there, they form a margin of many inches on the beach, where they remain until they are taken off by some higher wave to become food for the myriads of mouths, that are waiting for them.

Of the birds, which either live about Lough Neagh, frequent it in their passage.

Swan (cygnus), not now so frequent as they were in their passage ; they are neither so large nor so clear in colour as the tame swans.

Wild goose (anser), often in the meadows and marshes on their passage.

Widgeon (penelops).

Teal

Teal (*crecca*).

Wild duck (*boscas*).

Heron (*ardea cinerea*).

Bittern (*ardea stellaris*), now very scarce.

Curlew (*scolopax arquata*).

Woodcock (*scolopax rusticola*).

Snipe (*scolopax gallinago*).

Jack snipe (*scolopax gallinula*).

Green plover lapwing (*ranellus*).

Grey plover.

Sand Piper (*fraxineus*).

Coot (*fulica atra*).

Water-hen (*fulica chlorophus*).

Rail (*rallus crex*).

The gross-beak (*Loxia*) like a green linnet, but larger, often resorts to the wooded farms in its neighbourhood in winter.

The screech-cock (*turdus viscivorus*) is now frequent, and improves the rural concert by its mellow note, which seems to be compounded of the song of the blackbird and the melodious whistle of the thrush. This bird builds in high trees, and during the incubation of the female the cock chooses one of the highest, from whence he entertains her with his music. This is a very bold bird in defence of its young, frequently attacking the magpie, that seems watching for their destruction.

Jay

Jay (*corvus glandarius*) was much more frequent, before the woods at Portmore were cut; it is still, however, to be met with about Shane's Castle, and other woods at the borders of the lake.

Pheasants were formerly numerous at Portmore; now I believe they only exist at Shane's Castle, and its immediate vicinity. Wild turkeys are now nearly extinct, though once in such numbers at the former place; the breed, the true copper-colour, with red legs.

Little mention having been made of Lough Neagh, and its natural history, by the reporters of the other counties adjoining, I have been induced to speak of it, from that consideration; more at length and more particularly. I have taken a good deal of pains to ascertain the different facts, that are brought forward; but, if more has been said on the subject of petrification than seems necessary on a subject merely curious, I hope it will be considered as one so much belonging to Antrim, that it could not be slightly passed over. The fisheries are certainly objects of importance; so is the question of draining an object of at least equal attention; and, if this last should ever be seriously undertaken, what has been said of it may probably suggest some ideas useful for carrying it into execution.

State of the Fishery at the Leap and elsewhere.

The Salmon leap is situated in the river Bann, about a mile above the town of Coleraine, four miles from the sea; the land on the county of Antrim side of the river, for about a mile and a half below the town of Coleraine, and about the same distance above it, belongs to the Society, so that the estates of the Society extend on the county of Antrim side about half a mile above the leap.

The estate of the Society in the county of Derry side of the river, adjoining the Salmon leap, is very inconsiderable, being only a small strip of ground containing about an acre and a half, and extends along side the rock; on this ground the fish-house, weigh-house, and watch-houses are built; but the bishop of Derry's land (whose right to the fishery the Society have) extends for several miles up the river.

The Society have not built upon the entire rock. It extends in length about 60 perches above the cutts.

The rock is easy of ascent at all places, and fish constantly pass without opposition. The river at the rock measures in breadth 334 feet, and the fish

have a free passage of 137 feet. The cutts and walls take up 197 feet.

The walls take up 65 feet, which being deducted from 197 feet, the remainder is 132; so that from this computation the fish have a free passage of half the rock and five feet over.

There are several rocks, sharps, and fords, between the Salmon leap and Lough Neagh. At these places eel-weirs have been erected time out of mind, and Lord Donegall is now in possession of them, and has set them at 850*l.* a year, which is near as much as Lady Hamilton pays the Society for the salmon fishery; and Mr. Moore, tenant to Lord Donegall, some time ago erected cutts quite across the Bann, about eight miles above the leap, which hurt the fishery of the leap, it being impossible for any fish to escape.*

The lough is distant from the rock or leap above 20 miles.

Before the works (cutts, &c.) at the rock were built and erected, men were employed, who stood upon the rock with nets and took the fish coming up from the sea; they were called loopers; but that being expensive (the loopers being entitled to 3*d.* for

* These works of Mr. Moore were destroyed by Lord Donegall before he brought his action.

3d for each salmon and 1d for each grawl) in order to avoid that expense the cutts were erected.

The Cranagh, as it is called, is about a mile below Coleraine, and the leap same distance above it. They generally fish from the 1st of January, if the water be low enough, until the 12th of August. The old cutt is generally set and used for taking salmon in January, and, as the waters become low, the cutts near the shore are set and used; and when it is judged safe, the cutts towards the middle of the stream are set. The run of the salmon, as it is called, generally begins about the 20th of April or beginning of May, and continues until the latter end of May, when the fishing is slackened and not carried on so briskly as about midsummer, the grawl fishing beginning then, and continuing sometimes for several months. The grawl or young salmon is the fry, that went down in March, April, or May before.

Before the cutts were made, they fished with boats and nets at the Cranagh, which was on the 1st of May, and sometimes sooner, and always with three boats, although for these 20 years past there were only two boats and two nets employed, and these in the latter end of May or middle of June, and fished both night and day, if the fish ran briskly, until the 12th of August.

Each

- Each boat requires 30 *men*, and the expense of the two boats is generally from 20 to 30 *guineas* by the week; by means of the cutts a *considerable part* of the expense is saved, and yet (says Lady Hamilton) Lord Donegall or his tenant are no great losers, as very near if not more salmon were taken by the assistance of the 3d boat than in the cutt.

From the latter end of April to the latter end of May, or middle of June, if the season is rainy and the river Bann keeps full, the expense of fishing at the Cranagh is saved by fishing then at the cutts; but if the river is low, even the 1st of May, and a brisk run of salmon, the cutts are of little use, as the salmon press up the deepest stream between the new cutt and Carry Cam marked in the map B 28 or 29 feet broad, and then recourse is had to the fishing at the Cranagh. In a dry season few or none are taken in the cutts; it is very well known that, when the river is low, from one to four tons of fish are taken in a day with nets at the Cranagh, when all the cutts do not produce 500 weight of salmon in the same time.

Lord Donegall says, that less quantity of fish has been taken by him, since the new cutt than before; but Lady Hamilton says, if the fact be so, it is occasioned by the contrivance of the persons, who
intend

intend to farm the fishing from Lord Donegall; for that, before the expiration of Lord Massereen's lease, the farmers of the fishery fished with boats and draught nets, and a considerable quantity of fish was taken; but when the lease expired, and Lord Donegall got possession of the fishery, that practice was disused and less quantity of fish taken.

Lady Hamilton says, that Lord Donegall or his tenants do not interest themselves in the preservation of the mother fish or fry, and that the whole expense of water-keepers or bailiffs for that purpose is defrayed by the society or their tenant, to the amount of 300*l.* yearly; and that her men always assist the young eels in getting up the rock, which they could not accomplish, if it was not for the assistance they get by means of straw, which is laid on the rock for that purpose.

The new cutt C leaves a water-way between it and the cutt B 75½ feet wide in the upper part, 28 feet wide in the lower part, besides which there are two other water-ways; the one between the middle part F and the fish-house is 64½ feet wide in the upper part, and 88 feet wide in the lower part; there is likewise a sewer or passage on the right hand of the cutt G 18 feet wide; so that upon the whole there appears to be a water-way

way of 158 feet clear water at the head of the cutts, and 134 feet clear water at the foot of the cutts.

The cutt G, which projects further on the rock than any other cutt, has been built time immemorial, and was made up at a great expense, being cut through a solid rock, and was at first used as a sluice for the passage of boats and bringing the society's timber for sale, but has for time immemorial been used for the taking of fish. The cutt A was made about 1740.—B about the year 1752.—C in 1760.—E about 1735, and F about the year 1754.*

Rivers and small Lakes.

Most of the rivers, which belong to this county, take their rise in the mountains on the sea coast, and following the general inclination of the land discharge themselves into Lough Neagh; those, which flow into the sea, are merely torrents, except the river Bush, which in part follows the general rule laid down as far as Dervock; there finding a valley it keeps that as its course, until it
meets

* There was a special verdict obtained between the parties, which was argued in the Court of Exchequer in 1784, when the court awarded a *venire de novo*, on account of the jury not finding Lord Donngall heir at law to his father.

meets the sea at Port Ballintree, to the west of the Giant's Causeway. The Ravel water rises in the barony of Carey, the Braid river in lower Glenarm, Glenwherry river in upper Glenarm; all these rise in the mountains not far distant from the sea coast, and are branches of the Main, which, after flowing through Randlestown, discharges itself into Lough Neagh, having in the latter part of its course traversed the park and demesne at Shane's castle, which for extent, situation, wood, water, and all those capabilities, which can render a great place interesting and magnificent, is scarcely to be equalled.

The Six mile water takes its source in the mountains of lower Belfast, and falls into Lough Neagh at Antrim. Crumlin and Glenavy rivers rise in the mountains, which lie to the west of the road between Belfast and Lisburn, and reach the same lough at Sandy bay.

None of the rivers are navigable; the rapid descent of the country precludes that advantage, but at the same time gives birth to another; they are peculiarly adapted to the construction of mills; in consequence their banks are much occupied with bleach-greens, cotton, flour, and corn mills.

The Carey and Glenshesh with another stream unite and discharge themselves into the sea at
Ballycastle,

Ballycastle; the rapid falls of the mountains of Carey, with the great quantity of water collected by them in heavy rains, make horrid ravages on their banks, and form one of the most difficult obstacles to making a harbour at that place. Besides these, numberless torrents pour from the mountains by every opening into the sea, adding greatly to the beauty of the different scenes, and a number of tributary streams pour their share to the encrease of the lower Bann and the Lagan.

These last mentioned rivers not taking their rise in the county, and only dividing it from Derry and Down, will be noticed when the canals and fisheries are spoken of.

Of the vallies, through which these rivers flow, some are strikingly beautiful, as the Main water from Cullybacky to Lough Neagh, the valley of the Braid from above Broughshane until it falls into the Main, and the Six-mile-water from Doagh to Antrim. The valley of the Lagan I suppose is not to be exceeded by any tract of equal bounds in any country, for fertility and beauty, taking it on its whole extent from Spencer's bridge to Belfast.

The smaller loughs in the county of Antrim are few in number, and not large; Lough Lynch lies in lower Dunluce, Lough Hill in the upper half

half barony, Lough Morne three miles to the north of Carrickfergus; it is about a mile and a quarter long, and upwards of a mile broad; very little water runs into it; but a stream issues from it, which turns a cotton mill. To the south of Fairhead is another; and in the barony of Masserene is Portmore Lough, on whose banks the pious and learned Jeremiah Taylor lived. But Lough Guile, in the barony of Dunlute, deserves particular notice from its having been the chosen place of retirement of that great political negociator and traveller, Earl Macartney; here amidst a wood * of his own raising he spent many of his latter days; his manners and conversation a constant source of pleasure and of information to those, who were so fortunate as to enjoy his society. The following inscription placed over his hall door, and composed by himself, as expressive of some of the principal events of his life, was given by his lordship to the author.

Sub Libertate

Quieti

Hos avitos agros, has ædes restitutas et ornatas

D. D. D.

Georgius Comes de Macartney, Vice-comes Macartney de Dervock, Dominus Macartney, Baro

T

de

* Above seventy acres.

de Lissanoure, in regno Hiberniæ.—Baro Macartney de Parkhurst, & de Auchinleck in regno Magnæ Britanniæ, ordinis regii et perantiqui, Aquilæ Albæ, nec non ordinis præhonorabilis de Balneo Eques, & Regi a sanctoribus consiliis utriusque regni, in patriam redux, Anno 1796.

* Erin nos genuit, vidit nos Africa, Gangem
Hausimus, Europæque plagas fere visimus omnes,
Nec latuit regio primum patefacta Columbo;
Sinarum licuit dextram tetigisse tyranni;
Tartaricos montes, magnam et transcendere muram,
Turbidaque impavidi tentavimus alta Pe-che-li
Hactenus Europæ nullis sulcata carinis.
Casibus et variis acti terraque marique
Sistimus hic tandem, atque Lares veneramur
Avorum.

Mineral Waters.

Near Ballycastle there is a chalybeate water. It is remarkably light, strongly impregnated with iron.

Near the same place there is an aluminose vitriolic water.

On

* Lord Macartney was a native of Belfast.

On the great mountain of Knocklade near the same place is also a strong chalybeate worthy of notice, as it bears transportation to distant places. It lies on the side of the mountain on the lands of Drumans and parish of Ramoun. In a bed of marly clay at Killroot there is a purging nitrous water; and, rising from the same kind of soil, there is another water of the same nature nearer to Carrickfergus, adjoining the river which runs into the sea at the Scotch quarter. From the benefits, which have followed the judicious use of this latter, it deserves particular notice. I shall therefore give an extract from the Belfast News Letter, of October 3, 1786, which I have authority to say is perfectly correct. "Its many virtues and healing qualities have long ago received the sanction of the celebrated Doctor Rutty's testimony. That learned physician, in his much esteemed History of the Mineral waters of Ireland, has distinguished this with peculiar commendation. He took the trouble carefully to analyze it, and has accurately stated the composition in his celebrated treatise published in 1757. For the satisfaction of the curious the following extract is faithfully copied from his ingenious book. After observing that this is the only instance he met with, in his researches, of a water, wherein calcareous nitre is the predominant salt, and having mentioned the result of the several experiments

periments he had made with it; he adds, "the
 " principal impregnating salt is calcareous nitre,
 " and this in a very moderate proportion; with
 " which is combined a little marine salt, some
 " lime-stone, and a little sulphur. As to the dose
 " and use of this water, as far as yet known, it is
 " found to be purgative by the experience of the
 " common people, though it requires a large quan-
 " tity to produce any notable effect. Three pints
 " and a half are a proper dose."

" It seems to be an useful, mild, purging water,
 " and on account of its mildness preferable to se-
 " veral others, where there might be danger of ir-
 " ritation from too great acrimony. Accordingly
 " the people of the town, during the epidemic
 " dysentery about the year 1741, used frequently
 " a posset * of it with milk, which purged them
 " considerably, and they found great benefit from
 " it. And doubtless such a medicine, as not only
 " diluting and correcting, but carrying off the
 " acrimony, was far more safe than mere astric-
 " gents confining it within."

" Notwithstanding so favourable and satisfacto-
 " ry a testimony, this valuable water was seldom resor-
 " to, and had almost sunk into oblivion. Mank

* A posset generally in this country signifies buttermilk w
 until it curdles. It is very good as a gentle sudorific.

are unaccountably prone to neglect what is easily procured, and seek with incredible avidity more difficult, though frequently less efficacious remedies. This strange propensity permitted, what might justly be esteemed an important acquisition, to remain for many years entirely useless and filled with stones. At length, however, it was cleared out, and recent experience evinces, in the amplest manner, that the water retains its salutary qualities."

" During the spring season of the present year a violent flux, fatal to numbers, prevailed in the neighbourhood. The medicines usual in such cases were in many instances unsuccessfully applied. A lady, whose benevolent disposition is ever ready to relieve distress, and who humanely exerts a large share of medicinal knowledge for the advantage of the indigent, was induced by this failure to avail herself of Doctor Rutty's information, and try the effects of the water. The attempt happily succeeded beyond the most sanguine hopes; and she has the satisfaction of thinking that, by her means, many useful members of society have been restored to health and industry, when nigh exhausted by that loathsome and dangerous disease. No instance occurred, when the water was regularly and seasonably taken, in which the patient did

not

not recover. It has also been employed, with good effect, in bowel, rheumatic, and other chronic complaints.

Of salt springs there are two not far distant from Carrickfergus, one at Ballyhill, the other in Island Magee, near Red Hall; they are pure but not strong.

SECT. 5. *Estates*

Are in general freehold; for they are either immediate grants from the crown, or held under those grants. The exceptions are the properties under the See of Connor. Some of these estates are very great, as the Marquis of Hertford's, the Marquis of Donegal's, the Earl O'Neil's, and the Antrim estate which includes the northern baronies; the latter, however, being mostly set in perpetuity, is now in the possession of respectable country gentlemen. There are, besides, a number of other respectable properties in different parts of the county, as well belonging to the nobility as to the gentlemen. In the management of these estates there is nothing particular to be remarked, all repairs being the work of the tenants; in some cases landlords may have built upon the lands for the use of the occupier; after that the tenant has the further care. Farming leases are not

not at present granted of such a length as they formerly were; it is thought there is not the same reason that they should; lands are more improved, and the buildings are better; therefore the same necessity does not exist for length of lease as a security for improvement. Building leases in towns are long of course; landlords find their interest in granting those, as it enhances the value of the circumjacent lands. The rent of a large country is a most difficult matter to ascertain; for, what would be a moderate price for an acre of land in one situation, would be most exorbitant for one of equal quality in another. Situation is the great valuer; the opulent inhabitants of a large town pay for their convenience; and those, who supply large towns with the produce of their gardens and fields, pay to make profit by manufacturing their raw material, land; a few pounds per acre is no great object to either; but the price, another name for the value, decreases as the distance increases. At a certain distance then it might be supposed to have found its level; but that is not the case either; for one landlord often sets cheaper than another, though the grounds are of equal quality; besides, some estates have been set a few years before others, which creates another difference. To give the rent therefore, that land actually pays, may be done with truth;

but

but to say, that the different rents ascertain the quality, is not the fact. Any general information I may be able to collect and rely upon I shall give in another place.

Buildings.

Houses of Proprietors.

Nothing tends more to improve a country than the residence of enlightened proprietors; nothing embellishes it more than their habitations. Though there are few splendid houses, there are many characterised by convenience and elegance belonging to this rank in society. In addition to these must be mentioned that most respectable class, who are diffused over the great estates, but whose property in them is only leasehold; it is a striking and a pleasing sight to see what is done by them, wherever they have had encouragement to settle and improve, for these are synonymous terms. Yet the pleasure, that results from contemplating this subject, is fully equalled by the view of that comfort, in which the inferior occupiers of the land live, which is daily increasing; within these last thirty years, more has been done in this way than in the century, which preceded it.

The houses of the farmers, though in general not more than one story, nor very spacious, are neat and warm, often roughcast and whitened;

the windows sashed, and with the doors painted; covered with a good coat of thatch, and in many instances slated; and with one or two rooms floored. When the circumstances of the farmer enable him, and the size of his farm justifies him in doing it, there is often a second story. The offices of a farm-house consist of a stable, according with the number of horses required, a cow-house of the same capacity, and a barn sufficient to contain a stack of grain such as the owner thinks fit; to these may always be added a house for one or more pigs, a shed for his calves, and in many instances an open house to contain turf, cars, and other farming implements, to protect them, when not in use, from the inclemency of the weather. I do not take upon me to say, that this picture is universal; there are exceptions not only in single instances, but in particular parts, where things are not so well; but I could point out roads of many miles in extent, where the picture I have drawn would be realised. The materials, of which the farm-houses are constructed, in most instances, are stone, as excellent quarries of basalt are to be met with through the greatest part of the county. These stones when neatly put together, as they are, form a good contrast with the whiteness of the mortar; and, as they stand the hammer, make a permanent

and dry wall. In the district of Malone, and in some other situations where stones are difficult to be obtained, very comfortable houses have been built of clay; but that mode of building is now nearly out of practice, brick being substituted in its room.

The cottages of labourers and weavers, as well as of the other tradesmen who do not possess land, are inferior to the houses of the farmer; but still, as the others have improved, these have also improved; the general circumstances of the country have imparted to them a share of comfort; great attention has been paid by many gentlemen to the accommodation of their farming servants, by having for them comfortable habitations; the good sense as well as the humanity of this is evident, for, the more they perceive themselves to be objects of interest to their employers, the more attached they will be to them; besides the general feeling of a change for the worse in the event of misbehaviour.

Cottagers.

The cottagers on a farm are usually placed there for the purpose of assisting in the necessary labour; sometimes they are tradesmen; in this
case

case there is generally a bargain made for them or some one of their families to assist the farmer at particular hurrying times, at a certain price. This is a great convenience to the farmer, and gives a command of hands at critical times, without his being burthened with them through the year. This distribution of tradesmen, for the most part linen weavers, is of great advantage also in harvest; for at this time they are ready to give their assistance, when called upon; and having been bred in the country they are well acquainted with farming work. These tradesmen, who form the most numerous body of cottagers, are weavers; they are widely distributed over the county, as they can obtain situations, which it is often difficult for them to procure. It has often occurred to me, on viewing the great tracts of bog that are scattered over the surface of the land, that it would be a good speculation for the owners to set portions of it, with a small piece of the dry land to build upon; the great accommodation of fuel, and the comparative degree of independence such situations bring, would certainly induce numbers to resort to them. A present advantage and future improvements would be the consequence; and little apprehension need be entertained of exhausting the stock of fuel; for, both on inspecting the country, and

on examining the map, it appears that, from the northern shore of Lough Neagh to the sea coast on the north, one-fourth of that portion of the county is covered with turf. This soil, which under proper management is so productive, is now lost to the country, except for the small quantity of fuel it affords. It may be objected that, by thus occupying the bogs, the future source of fuel would be cut off; that would only follow so far as they are employed for fuel; bringing a bog into labourable land, unless it is burned away, does not destroy it as a source of firing; it dries and compresses, but does not diminish it. Lord Macartney, some years ago, added very much to the village of Dervock upon this principle, of setting small tenements to weavers and others; and when I saw it, it bid fair to be a thriving place; it is an excellent situation for firing; and it was his lordship's intention to allot a piece of bog to each house, with the idea of its being cultivated. A permanent settlement, let it be ever so small, carries with it an idea of property, that tends to respectability. On this subject I shall give a quotation from a number "The Monthly Review," which is most applicable to this subject, and expressive of good sense and humanity. "We perfectly coincide with Mr. M in the statement of the effects of a little pro

on the poor. It communicates, as Dr. Paley remarks, a charm to whatsoever is the object of it; and the cottage, the garden, the cow, or the pig, are more essential in promoting industry, prudence, and stability of conduct, than many persons are inclined to believe. All those plans, institutions, and charities, which foster habits of neatness and regularity among the poor, and which assist them, without taking the care of *themselves* off *their own hands*, are most likely to produce good."

SECT. 6. *Mode of Occupation.*

Size of Farms.

I shall be able, by giving in another place the particulars of the farms in some districts, to shew the very great difference there is in their contents; but in shewing this nothing new will appear to those, who are either conversant with the northern counties of Ireland, or who have read the statistical accounts of them. Where the land is uniform and no mountains occur, they are divided according to circumstances, that have taken place independent of all system. When the cultivated ground adjoins the mountainous districts, then the farms are naturally large, a considerable quantity of high land being usually set along with the plains or vallies; and in many instances there

are

are considerable tracts of green mountains held by distant occupiers, who keep a resident herdsman or two to look after the cattle, that feed upon them, whether their own, or belonging to persons, who pay for their summer's grass.

Much has been said, and much has been written upon the most eligible portion of ground for a farmer to rent, with profit to himself and advantage to the community; certainly no man ought to have more land in possession than he is able by his capital and skill to make the most of; and, if a whole country was unoccupied, then landlords would be acting right to make themselves masters of the subject, before any engagement was made; but here it is a matter beyond remedy; the large and the small farms are so interwoven, and the tenures are so various, and misery would ensue to so many persons by a radical change, that, though it may be a matter of speculation in this country, it can scarcely ever be looked to as a matter of practice.

Rents.

Rents.

Rents are all paid in money, not in kind.

Tenures.

Leases are generally freehold—some for lives and years—some for lives alone. Bishops' leases are for twenty-one years, often with clause of renewal.

Expense and Profit.

On this subject I find it impossible to say any thing satisfactory.

Implements.

Within these last ten years, a manifest improvement has taken place in the implements of husbandry. For this we are in a great measure indebted to Mr. Christy, and other gentlemen, who imported them from Scotland and from England. Their advantage over those formerly in use has been so evident, that they are rapidly spreading over the county; and, manufactures of them being established

blished in many places, they are now procured with much facility, and promise fair to drive out the old ones. Some years ago it might have been necessary to expose the bad qualities of the old, and praise the excellence of the new; but the matter seems to be so generally well understood, that every farmer of any eminence in his line is perfectly informed of the superiority of the latter. To Mr. Christy we owe the first importation of the Scotch plough, which was invented by Small; and to his example, in the application of it, in a great measure, we owe the general adoption of it. Other varieties of these implements for different soils, and different operations of tillage, have also found their way into this county. Ploughs with double mould-boards for earthing drills, either of potatoes or of turnips, and others for taking potatoes out of the drills are found to expedite those works, and to perform them in a superior manner. But one of the neatest machines of this kind, which I have seen, is a plough of Mr. Stewart's, of Willinount, calculated for taking the earth at once from both sides of the drill, and also answering the purpose of a double mould-board. To either operation it is adapted, by opening or closing it with screws, exactly fitting it to the portion meant to be taken off, or to be put to the drill. Harrows
of

of improved construction are much in use, which, without adding to the weight of the draught, touch the ground in all necessary parts. In the construction of the common car there is a great alteration for the better. Spoked wheels, turning on the axle-tree, have been introduced, and are gaining ground. But carts are in many places in comparatively general use, especially on large farms, and in the neighbourhood of towns. Near Belfast there are ten for one there was ten years ago;—they are mostly one-horse carts, well constructed and strong. Carts, but of a different description, called Scotch carts, are used by the public carriers, to the total exclusion of the common car. These have not a box; they have flat backs, made of cross boards for tying on the loading, and, with a good horse, will draw from fifteen hundred weight to a ton; the usual load about eighteen hundred. It is to the diameter of the wheels they are indebted for their powers; but in ascending hills they are very severe, and in descending not easy; their proper place is on a level. If one person was owner of many carts, the best mode, that he could adopt, would be to have a spare horse to put on at the hills, the keeping of which might be made up by the consequent expedition. Several threshing machines have been erected within ten or twelve years past; that at

Trumery, by Captain Stewart, was the first; Mr. Dobbs, near Carrickfergus, has one worked by water; Mr. Whittle, of Thistleborough, near Glenavy, has one also upon the same construction; Mr. McNeil, of Larne, has had one for several years at his farm in Island Magee, and has now erected a second; as also Mr. Hunter of Ballymagarry; and this year Mr. Gorman, of Broom-mount, has set another going. To these may be added, that Mr. Stewart, of Willmount, is erecting one. On farms, large enough to afford such an expense, nothing can be more desirable; the expedition, with which it does its work, the complete manner in which it takes off the grain, and the speedy handling which it promotes, make it a great object indeed; for one of the most tedious processes in farming is the usual mode of threshing, subject to so many frauds, whether it is performed by measure, or by the day. In addition to these advantages, it must not be unmentioned, that in bad weather the whole force of a farm can be applied to this work, when every other labour is suspended. One accompaniment there ought always to go with this machine, a house to preserve the straw, if cattle are to be fed with it; otherwise its qualities suffer much. Other implements are the fan for winnowing grain, now in very general use; potatoe-

potatoe-washers; turnip and potatoe cutters; with turnip drill barrows, pushed like a common wheelbarrow. Rollers are in some cases used, but not so often as they should be; for I will venture to say, that one passing of a heavy roller over clay ground, baked with the March winds, will have more effect than five turns of a double harrow.

Catalogue and Prices of improved Implements of Husbandry.

On the first introduction of the threshing machines they were upon a much larger scale, and consequently more expensive than those in present use, notwithstanding the increased price of materials and workmanship. At the time Mr. Stewart and Mr. Christy erected theirs the cost was near 100*l.* now they can be made for less than 50*l.* they are much smaller, and much more easily worked, and stand in the barns in a space of about thirteen feet by seven. Those, that are made in Scotland, are cheaper than 50*l.* paying every expense, even of the workman, who comes over to set them up.

Of the other more common implements there are very numerous makers in Belfast; and at the founderies there all the parts, that require to be made of cast iron, are to be obtained. In Lisburn there

there is at present a very extensive manufactory, carried on by Edward Gribber, Castle-street; he has been at great pains to procure the best workmen, and the best models for every implement in husbandry; that it may be known, where these are to be procured and their prices, I subjoin the following list, as furnished by himself; adding that he has given general content to those, who have employed him.

Large farming carts mounted on different constructions -	from 10 $\frac{1}{2}$ to 12 $\frac{1}{2}$ guineas,
Smaller do. -	8l. — 10l.
Carriers carts -	9l. — 12l.
Hay carts -	14l. 15s. 9d.
Carts for a pair of oxen	— 14 guineas
City or police carts with sliding bottoms -	— 17 ditto.
Farming cars with spoked wheels, turning on axletrees to tumble up like carts	— 6 — 8 ditto.
Common cars -	— 4 — 6 ditto.
Hand carts with which a man can carry from 2 to 6 cwt. -	— 2 $\frac{1}{2}$ ditto.

Drill

OF THE COUNTY OF ANTRIM. 157

Drill barrows double, to			
sow two rows - —	3	guineas,	
Do. to sow one row -	1 <i>l.</i> 14 <i>s.</i> 1½		
Wheel-barrows, from	18 <i>s.</i> to 1 <i>l.</i> 6 <i>s.</i>		
Hand-barrows - -	8 <i>s.</i> 8 <i>d.</i>		
Bleacher's barrows -	12 <i>s.</i> 0		
Large double rollers			
with a box - —	12	guineas,	
Single do. - - —	2 — 5	ditto.	

Ploughs of different sorts.

Wilkes improved or			
Blanter plough - —	3½	guineas,	
Do. with two socks and			
knife for opening			
ground - -	4 <i>l.</i> 16 <i>s.</i> 6 <i>d.</i>		
Small plough with a			
chain - - —	3½	guineas,	
Do. with a common			
muzzle - -	3 <i>l.</i> 13 <i>s.</i> 6 <i>d.</i>		
Right and left furrowed			
plough - - —	5	guineas,	
Drill plough for open-			
ing drills and mould-			
ing them - -	3 <i>l.</i> 0 0		
Clunie's long plough - —	3	guineas,	
		Common	

Common Irish plough from 1*l.* to 2*l.*

Harrows of different sorts.

A potatoe double harrow, full mounted 4*l.* 11*s.* 0

A single one of another plan, full
mounted - - - 1*l.* 10*s.* 0

A double break harrow, full mounted 3*l.* 19*s.* 7½*d.*

Jointed do. five burrs, full mounted 3*l.* 8*s.* 3*d.*

Do. four burrs, full mounted. - 2*l.* 16*s.* 10½*d.*

Single harrow full mounted, with three
burrs - - - - 1*l.* 14*s.* 1½*d.*

Market cars, from 5 to 7 guineas.

In addition to these may be had at the same place hemes, cart straddles, with every minor instrument in the farming line.

All kinds of carriage wheels are manufactured at the same place; with coach, cart, and car axletrees turned in a lathe made for that purpose.

Winnowing fans, with a double and single blast, are also made in various parts of the county, price, from four to six guineas.

Fences.

The soil of the county of Antrim is particularly favourable to the growth of the white thorn, and the good farmers take advantage of this circumstance,

stance, by planting all the new made ditches with thorn quicks; a strong proof of the extensive demand for them is, their being exposed for sale during the planting season in many of the markets. The banks of these fences were made formerly much larger than they are now; for, it is found that the hedge makes a much greater progress in a thin than in a thick bank; and the value of land is so much better known, that less of it is consumed in that way. The most approved mode of making them now, is to face the bank with the field stones, standing nearly perpendicular, and with the 2d or third row of stones to lay in the quicks, having some of the best earth put about them, and the remainder locked up as near a perpendicular as it can be, so that cattle cannot gain footing upon it, either to trample it down, or to eat the young quicks. The trenches are of various depths and width, but a very narrow one, with a well formed bank, makes a good fence immediately; there is in most cases a scarcement of a few inches, to prevent the stones from slipping.

The cultivated appearance these fences give to the country, with the shelter they afford to cattle, and the security imparted to the growing crops by them, are considerations of great consequence; and in great districts they have produced their effect

effect. The growth of the white thorn hedges, through the barony of Masserene, is so vigorous, and they are so numerous, as of themselves to give the country a wooded face.

It would be trespassing too much to particularise all the parts of the country ornamented by them; but I cannot pass, without a second notice, the great care, with which the hedges are made and kept between Antrim and Kells, after the mountain is passed; about Kells nothing can be more chearful. The mountain fences are, either of stones gathered from the surface or thrown loosely together in many cases, or drains and banks of earth; from the mode, in which they are made, they are rather marks of the division of the properties, than restraints upon the cattle.

I do not observe any thing particular in the management of the quicks, except keeping them very clean after planting; for the same vigour of soil, that encourages them, supports weeds with equal vigour.

Gates.

Where fences are good, there some attention may be expected to be paid to render them useful, by a proper method of opening and of shutting
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the inclosures they form. Accordingly gates, though not of any very particularly good construction, are frequent, and contribute their share to impart an air of neatness and comfort to the whole.

The entrances to gentlemen's places are ornamented by modern approaches, in various fashions; and their fields well divided, and shut by gates upon the best construction. These objects are productive of pleasure without doubt; but, as a matter tending to impress an idea of the prosperity of a country, the farmer's attention to neatness, and in this way to embellishment, is much more conclusive, and must in a high degree contribute to the gratification of every resident gentleman; for, how limited must be his rural pleasures, when confined to his own demesne, and how shocking the contrast, when on his issue from it he sees nothing around him, that can be in any degree an accompaniment to what he has left?

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CHAPTER

CHAPTER II.

AGRICULTURE.

SECT. 1. *Arable Land.**Mode of Culture.*

The tillage system of this county will be best displayed, by detailing the management of the soil for the different crops commonly cultivated.

Wheat.

The great wheat district extends along the shore of Lough Neagh, comprehending the south parts of the baronies of Toome and Antrim, the west and southern parts of Masserene, the south and east of Belfast as far as Larne, being bounded in the last by the mountains. In addition to this, there are many other parts where this grain is cultivated, but not in the same proportion.

Preparation.

Preparation.

1st. *Plain fallow.* This mode still prevails, particularly in Lower Masserene, in the parish of Killead, where the soil, being of a very strong clay, requires all the assistance, which the plough, the winter's frost, and the summer's sun can afford. The best farmers break up for their fallows before winter, give a second ploughing after their spring corn and potatoes are in the ground; then they harrow the land well; upon this the manure is spread, either lime by itself, or mixed with earth; then another very light stirring before sowing; the whole is laid either dry, by water-furrowing, or by shovelling between the ridges. In some cases the wheat is put in with the last ploughing. When lime is laid alone, from 100 to 120 barrels are applied; when mixed with earth, about half that quantity.

2d. *Potatoe fallow.* This is the most general preparation for wheat throughout the county, and certainly has the advantage, from no intervention of an unproductive year, and no labour but that required for the growing crop, except the seed furrow.

3d. *After clover.* Wheat after clover has not been found to answer the general expectation; it is

not

not a good preparation, where the soil is heavy, and where it has not been in the very best condition previous to the clover crop; but, where it has been tried in favourable ground, clean, and high in heart, I have seen it answer well. Wheat is sometimes sowed after other grain, and after flax; this, when it is done, is from the reliance on the richness and freshness of the soil. Great crops are sometimes raised in this way.

Seed. The quantity sown by the best farmers, is about five Winchester bushels to the Irish acre. Their opinion is, that sowing thick not only prevents weeds from growing, but that it makes the crop come in more regularly and more early; for all thin crops are more liable to suffer from the mildew, probably, because from their tillowing they are later.

Time of sowing. On fallows so early as the latter end of September, or the beginning of October, to secure as early a cutting as possible. On potatoe fallow, the time depends upon the getting out the potatoes, which often is not accomplished until the latter end of November. At this time it succeeds well, and often later. When the sowing is retarded much beyond this time, the better way is to wait until the frosts are over, and rains have subsided.

Little

Little culture is bestowed on the growing wheat, except pulling out the larger weeds by hand. Sometimes it is rolled, or even harrowed. One gentleman told me, that he covered a piece of wheat in spring with fresh soil from the furrows, and from this top-dressing he had a great produce.

Harvest—is not very regular. What is sown early in Autumn, is generally fit to cut (soil and situation the same) a fortnight sooner than that sown in February or March; but on the sandy and gravelly soils the later sown comes near the fallow crop of strong clay. From the middle of August to the latter end of September may be reckoned, (taking one year with the other) about the period of our wheat harvest.

Wheat is always reaped, and tied in sheaves, twelve of which form a stook; these are sometimes made double, to prevent them from falling.*

Threshing is not approved of unless the grain is very dry; when that is not the case, it is bruised on the barn floor, and grows blue-moulded. Lashing it is much better, though more tedious. But the operation of separating it from the straw is performed better, and more expeditiously, by the threshing-machine.

Produce

* Wheat is every where reaped much greener than formerly; this prevents loss, and affords a finer sample.

Produce. This is greatly in favour of the fallowed ground on the stiff soils, so much so, that I was informed by a very intelligent farmer in Killead, that the difference nearly paid the expense of the labour; so much was plain fallow superior to potatoe fallow. Two tons the fresh acre is not extraordinary; one and a half ton common. But I am here speaking of the best culture in the most favourable soil; in the lighter soils the quantity is not so great. In good years a ton may be taken as a fair average. The manufacture of wheat into bread is within these last ten years most extensively diffused; before that time it was confined to towns or large villages; at present there is not any public house in the most remote places, where good bread may not be met with. For this we are in a great degree indebted to the flour-mills, which, by putting in a small compass the more nutritious parts of the grain, render it more portable.

Sort. Varieties of wheat are every day appearing; it is very difficult, therefore, to say what is the most valuable kind: a species, called the Lammam Flood, is much prized for its produce, and for being early ripe; but it sheds the proudest grains if it be not taken in time. A species also called
Scotch

Scotch wheat, from its being imported from that country, is prolific; but the ears, being of a bulky and open construction, are supposed to retain moisture, which renders them, in wet weather, apt to sprout, which was the case in the harvest of 1809, even before it was reaped. The white-strawed and velvet wheat still keep their character on light and gravelly soils. Spring wheat is almost unknown, although there is a great deal of wheat sown in spring; that is, all through the month of February; the cause of which, as mentioned above, is the late taking up of the potatoe crop, and the experience, that, unless wheat has a good root, and covers the ground before the frosts set in, it is better unsown until after that time: therefore it is, that in the sandy soil between Lisburn and Belfast it is put in so late.

Steeping the seed. This is not so much in fashion as it formerly was. It certainly seems extraordinary, that so small a quantity of any substance, as a grain of wheat can imbibe, should have so strong an influence, during the growth of near a year, as to prevent the smut, a disorder, that is entirely confined to the ear, and often to a few grains in that ear; a temporary vigour certainly may be imparted to a seed by the salt it imbibes, and the lime that covers it; but that can
last

last only a short time. The steeps here alluded to being of a nature to assist the sprouting of the seed, may in that instance do good, and can do no harm, when properly managed. But what is to be said of steeping wheat in a preparation arsenic?—the operator must certainly take the same care for a living animal, when he attacks it in the same deadly way. From some observations I made during four periods, I am much inclined to think that the quality of the grain, provided it is of a strength sufficient to vegetate, has very little connection with the smut, or with any other disorder to which wheat during its growth is liable.—The year 1798 was remarkable for the goodness of the wheat crop; of course the seed of that year was sowed for the ensuing one: when that came to be reaped it was a most miserable sight, full of every imperfection, that wheat is liable to from the vicissitudes of seasons; as no good seed was to be procured this, of necessity, was sown, and, in 1800, the wheat was superior even to that of 1798; but a fair sample next year produced a most smutty offspring. I am therefore inclined to think, the cause of this defect must be sought for, not in the seed, but in some other circumstance. Darwin thinks it proceeds from want of improp-

tion, and that what happens in the ear of wheat, is similar to the case of the eggs of oviparous animals, which when, without the vivifying principle, corrupt, instead of producing, life. When wheat has smut, it is recommended to lash it, not to thresh it; for in lashing, the smut-balls come out whole, and may, if not broken by the feet, be easily separated from the sound grain without injuring its colour. The smutty powder may also with safety be washed off the sound wheat, previous to its being dried.

A much more serious, because a more extended disorder, remains to be mentioned; namely, the blight, or mildew. This is not confined to a limited number of ears, but at once spreads over whole fields, attacking the vital principle of the plant, and leaving the ear to languish and consume, according to the stage of growth in which the plant is. This disorder is the more or the less injurious. But, whatsoever stage it is in, the only palliative is to cut it the instant it is perceived to be struck; for it is well known, that every instant wheat stands after the mildew appears, is mischievous to the grain; and it is found that it fills after being cut, though it consumes when left standing. How to account for this I know not, but this fact I saw ascertained some years ago, by the Rev. William

Moore, at Mount Panther. The rust is another disorder, to which wheat is subject; in this case the orange powder is generally confined to the ear getting between the chests and the grain. This I have often seen, but the injury is more partial, being confined to a smaller compass. But the cause (the orange powder) seems to be the same. By the writers on the subject this powder has been supposed the seed of fungi, which adhere to, and take root in the straw, and by their growth so injure the texture of it, as to destroy the power of conveying nourishment to the ear. Whether this be the case or not, it is much to be wished that the cause was once ascertained, as then a remedy might be found. As matters stand at present, no palliative alone can be administered, and that is, Mr. Young says, cutting, at whatsoever stage of growth the misfortune happens.

The cultivation of wheat is not confined to the district above-mentioned; I met it very good between Stranocum and Dervock, in the parish of Derry Thechan; the fields there were not large but they shewed what the ground was capable of. About Ballymoney I have seen excellent crops, especially at Leslie Hill, where it was managed by the late Mr. Leslie in a superior manner, as in every other branch of farming. The soil of

the low lands of Antrim seems particularly well calculated, under good management, for the production of this kind of grain.

Barley.

Though the county of Antrim is not a barley country, yet there is a good deal raised in it; for, notwithstanding the general character of the soil is more adapted for wheat, there are dry and gravelly swells dispersed throughout, which are favourable to it. The general preparation is a potatoe fallow; but it is often sowed after wheat in two ploughings. If the ground has been in good heart for the wheat, the barley is good; if not, it is otherwise; but barley is seldom attempted, except there is a prospect of success. Few farmers now dung their ground, as formerly, for barley after a winter's fallow, which was 30 years ago a very common thing; it is curious to observe the changes in practice; all that kind of manure is now applied to potatoes; the change is certainly for the better; and fallow is one step to a good course of cropping.

Sort. The four-rowed, which is reckoned more profitable to the farmer than to the maltster; though this species may not make so much malt from
a given

a given quantity, it certainly makes it of a very fine quality, being very fair in colour and thin in skin.

Quantity of seed. About five bushels to the Irish acre; if it is got in, when the ground is in proper order, in the latter end of March or the beginning of April, a smaller quantity may do, because it has room to spread, and may be ripe soon enough; but all grain, that is sown late, ought to have more seed, which hastens the ripening of it. By this means it sooner covers the ground, and runs to seed.

Time of sowing. From the latter end of March to the beginning of May—the middle of April is the most usual season.

Harvest. According to the situation and time of sowing, from the middle of August to the latter end of September. It is all reaped and stored in the fields, until it is sufficiently dry to be stacked—threshed in the usual way, except where machines are erected for the purpose; but the threshing of barley is not so completely performed in this manner as in the usual manner; for it does not take the awns so clean, which gives the grain a husky appearance, and disfigures it, so that to the buyer it gives an excuse for an abatement of price. The way to remedy this, is by threshing it a second time, after it is separated from the straw.

which is not a tedious operation, and is well paid for by the additional price its fine appearance brings.

Produce. This is the end, to which all cultivation tends; and is as various as the land that affords it, and the skill of the holder. When barley follows potatoes, either drilled or in ridges, upon soil that agrees with it, then the crop is the best; and this is the culture given to it, where it is the first object; in this case two tons, and sometimes more are gained on the northern coast, where this is a favourite grain, this quantity is not uncommon, and about towns where manure is to be had, that agrees with it; but where it is only a secondary object, and succeeds another crop of grain, the case is different, one-half of this produce being nearer the truth.

Oats.

The quantity of oats, sown in the northern counties of Ireland, is great in proportion to that of any other grain. The straw forms the chief support of cattle. The produce of the grain, joined to potatoes, forms the principal food of the great body of the people; from thence it naturally arises,
that

that much attention should be bestowed on the cultivation of this grain, to which the soil, especially in the lower lands, is perfectly well suited, as will appear when the produce is spoken of.

Tillage. Oats are sown after potatoes, where wheat and barley are not generally cultivated, and one or more crops are taken, until the benefit of the fallow is too often completely done away. They are likewise sown on grass ground, that has been manured with lime, or any other substance used for the same purpose, and this is done without any other tillage than one stirring for each sowing.

Where wheat and barley are cultivated, oats are only a secondary consideration; but, as the raising of those crops implies a superior degree of husbandry, so we find those, who cultivate oats, pay a greater degree of attention to them, as also to every other production of the soil.

On wheat and barley stubbles, and on one ploughing, oats are generally sown on farms, where those crops are the principal; and, the soil having been put into the best condition for their reception, very excellent returns are received, because the soil being generally strong, and the previous crops good, as well as the manuring plentiful, there is nothing like exhaustion, the ground being

from the same cause; the oats in most cases turn out considerable in quantity, and in quality excellent.

Since the cultivation of clover has encreased so much in the southern parts of this county, clover lea is often the preparation for oats; one ploughing only is given, but the furrows are in most cases shovelled, and in many instances dug, or ploughed and shovelled, an excellent method, as it answers two good purposes, the covering the seed, and keeping the ground dry; in addition to which, it may be observed, that the shovelling of the furrows forms an excellent surface for the reception of the roots, which in all culmiferous plants run near the top of the ground.

Sort. The Poland, the Blanter, and a species called Kell's water light foot, have been long in possession of the soil. To these have been added the potatoe oat within the last ten years, and a kind, called white Holland oat, first introduced by Mr. Gorman of Brown-mount.

The Poland oat seems to be well adapted to the stronger soils, and indeed to most grounds in good condition, but on strong clay it peculiarly excels in the brightness of its colour and in the thinness of its skin; the strength of the straw contributing

to

to the support of the ear, which is both long and heavy.

The Blanter oat is not so clear in colour, nor heavy in the ear; but the skin is very thin, and bears a more exposed situation; for, the fibres which join the grain to the straw, are strong and not so liable to be broken by the wind; it ripens later than the Poland by a week or days.

The Kell's water light foot is better adapted to light and high soils, than either of the above mentioned species; but on deep land it is not so productive, and is mostly confined to the low grounds.

The introduction of the potatoe oat, within last ten or twelve years, has caused a considerable change in the quantity sown of the other species; it is now too generally diffused to require a particular description, but the plumpness of the grain and thinness of the skin seem to give it a decided superiority on all well cultivated soils, and with well cultivated soils it seems to agree; it is the earliest of the species, and may be sown up to the first of May; in the reaping of it, however, it requires great attention, not to allow it to be ripe, nor to handle it roughly, as it easily

from its straw; it therefore ought to be cut before it is all yellow; for, in delaying to reap it until that is the case, the top of the ear (always the best) is lost.

The white Holland oat very much resembles the Poland, but is rather clearer in the colour of the grain as well as in the straw, and requires the same attention in not allowing it to remain on the ground uncut until it is uniformly ripe.

Seed—quantity sown. About ten Winchester bushels to the Irish acre, except of the potatoe oat; which having no awns lies in a smaller compass, and consequently an equal measure of it contains more grains than any of the other kinds; seven bushels of this seem to be about the proportion approved of in the broad-cast method.

Time of Sowing. As early as the season and soil will admit—on moist grounds the operation of tillage cannot be performed as early as on those, which are drier and lighter. In the sand plains, between Belfast and Lisburn, oats are often overground before the farmers in either parts are prepared for sowing; but in all soils an early sowing is much wished for. The potatoe oat has this additional advantage over the other kinds, that it may be successfully sown even in the beginning of May, as I mentioned above.

No culture, whilst growing, except pulling large weeds.

Harvest. That depends on the season, on the soil, and on the climate, there being often an interval of not less than six weeks between the dry plain and the humid mountain. In the former harvest often commences in August; in the latter it often does not commence until October, before mowing; all reaped and put up in stooks of twelve sheaves each, two covering the upright.

Threshing.—In the usual way, generally speaking. The price about one shilling per bole, of ten Winchester bushels.

Produce.—From circumstances and situation this varies greatly. Where land of the best quality is sown, in good condition, I am credibly informed, that 120 bushels have been produced on one Irish acre, and that 100 bushels are not common; but this must be, where oats are the first object, or at least where they have been treated in the first manner. On stubbles, that have been exhausted by repeated cropping, the quantity is small in comparison, not the one half. In the wheat and barley districts, oats are generally sown after one or other of these crops; as the previous culture has been good, the oats are good also, probably from sixty to eighty to

els. When lime is laid on the sod, it is the usual mode to sow oats for the first crop; this, if the lime has been a sufficient time on the ground, gives a good return, the second sowing a better, and the third not inferior to it. But after this, if the cropping is persevered in, which it often is, the producing quality diminishes, until the return becomes small indeed. This destructive mode was some years ago much more in practice than it is now; among good farmers it is entirely done away. In the mountainous districts, where no other grain is sowed, the quality is inferior as well as the quantity; much of this inferiority is owing to the climate, which prevents the ear from filling; for oats, being in those parts the first object, are prepared for by potatoes. The best chance in such situations to obtain a tolerable return is, by sowing the potatoe oat; provided the soil is rich, it is seldom too light for it; and its early ripeness helps to counteract the defect of climate; on the Braid river near the mountains this has been fully proved.

I shall now say a few words on the comparative value of the three kinds of grain I have been treating of. Wheat certainly, where it succeeds, from its superior price, pays better than either of the others; but it is also certain that it often fails, when
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the others do not. Smut, blight, or mildew, &c. bad harvest, often make great inroads on the farmer's profits on this grain, when barley or oats escape from hurt. I should not wish to say any thing to discourage the cultivation on soils, that are not fit for it, but to caution those, who may be carried away by the ideas of superior profit, from rising too much, where there is not every probability of success, nor of forcing it on lands better adapted by nature for barley or for oats. The high price of wheat some years ago, when compared with the low price of these, was sufficient to have induced the grower from a loss in quantity; but there is a great alteration, especially in the price of oats, which, in consequence, have been found for the last seven years at least, to have paid well, if not better than any other crop; because of the advantage of affording a support to the stock of the farm. Barley is also liable to many drawbacks, though not to so many as wheat; but it will answer in more situations; but as it is necessary for all other operations of the farmer, is undertaken for the advantage it produces, let it be compared with oats, which have had the same preparation. The oats, I will venture to say, will exceed barley so much in weight, as to make up any inferiority

there might be in the price, which of late has been very small.

Markets for Grain.

Buyers from Belfast are employed in many parts of the county for the purchase of grain, especially where it can be stored within reach of water-carriage, which is the case with all the district I have mentioned as productive of wheat. These buyers take it off the farmer's hands, and send it, as opportunity offers, by the canal, to their employers in Belfast. The different flour-mills afford very convenient resources to the farmer; indeed, these, and the persons commissioned to buy, are the only methods now in use for the selling of wheat, which is never exposed in the public markets, as it formerly was. Barley is bought for malting by the brewers, who follow both occupations. Little of this grain is now used in the distilleries; the barley of the northern coast, however, must be excepted, which is purchased by the people of Enishowen. For oats, or for the meal that is made of them, there is a ready sale in this populous country, either at the farmer's own door, or in the towns and villages in his neighbourhood.

bourhood. The demand for this grain is likewise great in Belfast, both for its own consumption and for exportation. But the most celebrated market for superior seed oats, is the town of Lisburn which being within reach of the farmers of Ballylinerry, Soldierstown, &c. where the finest kinds are produced, and where they are cleaned in the best manner, has long established such a character as to induce distant farmers to resort to it for change of seed; a matter certainly of great importance (when done with judgment) to the future crop. As a matter both of utility and necessity, I subjoin

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*A Table of the quantities of Meal obtained from
Oats of different weights per bushel.*

Winchester bushel of oats. Weight of meal.

Weighing 42 lb. Averdupois, produced 25 lb. 2 oz.

41	-	-	-	24	4
40	-	-	-	23	6
39	-	-	-	22	9
38	-	-	-	21	12
37	-	-	-	20	15
36	-	-	-	20	3
35	-	-	-	19	7
34	-	-	-	18	11
33	-	-	-	18	0
32	-	-	-	17	5
30	-	-	-	16	1

This was ascertained by experiments of a gentleman in Aberdeenshire:—his account went so low as a bushel of oats, weighing 16*lb.* producing 6*lb.* 15*oz.*. The oats are supposed to be weighed in March, when they are dry*.

From

* I am indebted to the Rev. Dr. Trail for the above Table.

From this Table it is plain, that a bushel of oats, weighing 42 *lb.* is worth more than three shillings, when the same measure weighing 30 *lb.* is only worth two, which is a plain proof, that weight is the only just criterion of the value of grain is weight.

Peas.

I have not met with them as a field crop, on lands, adapted to their growth, no better preparation for grain can be given; they shade, and enrich the ground, where they succeed, and on a light soil is favourable to them, and on good wheat often follows.

Beans.

Have been long cultivated in Island M and in the parish of Cairncastle, which is between Larne and Glenarm; the soil is well calculated for them, being deep and strong; they are sown broadcast, instead of being drilled; notwithstanding, the crops are very large, up to 70 bushels the Irish acre; they are of the white kind, and take about 8 bushels of seed. The bean culture was introduced generally, it will be one of the most beneficial changes, that can be made; for, a drilled crop of beans would entirely preclude the necessity of a plain fallow. In the parish of Killead this substitution would be excellent; for, every thing there is fitting

The drilled culture of potatoes is so common, that drilled beans would come most easy; and the soil is what would be chosen in any part of the world for them, being strong and deep, and with a clay bottom. In addition to this it may be observed, that the ground ought to be ploughed in autumn, which in a wet country is an advantage, and dibbled or drilled in very early; which can be done without bringing horses on the ground, which ought to be previously manured, if the intention is to sow wheat after them, for which they are a most excellent preparation, provided they have cultivation; whilst they are growing, to clean and mellow the soil; the advantage of which need not be dwelt upon, to recommend it to those, who are sensible of the benefit of this mode from having successfully practised it on potatoes. To farmers, who are in the habit of making fallows every year, beans would be a complete gain; the work would be little more than the fallow is, and an additional crop would be the result, by which excellent food would be acquired, as a substitute for oats; or another article for the market. Beans being a restorer of the ground, as a leguminous plant, with a strong tap root, may be sowed after any kind of grain; and one of the most profitable

branches of farming, is the cultivation of wheat and beans alternately, where the soil will afford it. The intervals between the beans ought to be such as to admit of being ploughed between the crops as well for convenience, as to admit the free circulation of air: for, where they are too close, they never have pods at the bottom; and, as they stand upright until harvest, they may be hoed during the whole season. Though beans have been spoken of as liking a strong soil, they will succeed upon others comparatively light; but there the introduction of them is not so necessary. I have mentioned in another place the great returns of wheat and plain fallow in our strong clays, which, joined with the state in which the land is left, is what the farmer, in many cases, prefer it to a fallow crop (of potatoes for example) because often he cannot get his ground in order time enough for wheat. But with beans it would be totally different; they, if sown early, as they ought to be, the ground having been ploughed and manured in autumn previous, would admit of a much earlier sowing, than a potatoe fallow—an advantage in the management of wheat, that every farmer is aware of, but which, from circumstances, he neglects. Beans are cultivated here rather as

paration for oats than for wheat; and being sown broadcast, and afterwards left to themselves, it is likely they would not answer that purpose. But a very small alteration in the mode of culture would remedy this defect. A very simple and excellent way of putting them into the ground, and after-management, is practised in the North Riding of Yorkshire, which might here be adopted to advantage. The land, in autumn, is thrown into narrow ridges; in spring the beans are sown in the furrows, and covered with the plough, but not deep. When they are a little above the ground, the whole is harrowed, and, as the beans lie low, they are not injured, which serves the double purpose of a moulding, and a clearing from the young weeds. After this operation, they are earthed up in the same manner as other drilled crops.

Bere, or winter barley, was much sown in the barony of Masserene; now it is never cultivated; when it was, the preparation the same as for wheat, and the produce very large—near two tons an acre. Rye also is nearly given up, though it is a productive grain on ground not fit for wheat, and makes sweet and wholesome bread.

Flax.

Flax.

The different kinds of flax-seed sown in county, are the Dutch, the American, and late the Riga. The Dutch seed is supposed to be the produce of the Riga seed raised in the Netherlands; whether that is true or not, the characters of the seeds as imported here are very different; for, though they approach nearer each other in colour than the American seed does to either, the size and shape are very different; the Dutch being broad and flat, and dull coloured, while the other is of a brighter colour, and plumper appearance. The American seed is in colour like the Dutch, but smoother in the skin. The Riga seed is sold at a higher price than the others, as its supposed superior produce. The Riga is now less esteemed than it was, but the American is now the most generally used. The annual average importation of flax-seed into Belfast is 5,000 casks of about seven bushels each; but there is more imported every year than is sufficient for the consumption, which has been a fortunate circumstance, as it assisted in supplying us during the interruption of intercourse with America. The seed is well saved, and carefully stored, it will

for several years*. Riga a seed, that had been imported in 1807, grew, and had an excellent crop in 1810. The time of sowing is as early as the spring season will permit; and, the sooner the seed is committed to the ground, provided it is in good order, the better, and the texture the stronger and firmer. April is the usual time in the southern parts of the county; in the middle and northern parts, some weeks later; but even there it is earlier than it was.

There is a great change in opinion, respecting the preparation necessary for flax; a potatoe fallow was thought to be the only certain mode; now it is known, that it will succeed on lea ground, or on stubbles that have been carefully tilled. Flax acts as a fallow crop; it is tap-rooted, and feeds far below the surface, so that it is a good preparation for grain. When it is sown after potatoes, a stroke of the harrow is given before sowing; one stroke is sufficient to cover it. If it is sown on ground, that has been prepared by ploughing for it, the ground is well harrowed, before the seed is put on it, then covered as before. The greatest quantities of flax, I believe, have been produced after potatoes,

* I sowed flax-seed consecutively five years old; the crop was excellent.

potatoes; but land, that is not fit to be sown grain, will yield a good return under the form

The quantity of seed sown, where it is sown on a large scale, is about three and a half bushels to the Irish acre; where only a small sowing, generally thicker, with the idea of a finer flax; when three or four inches long, most carefully weeded, if it requires it; and weeding there is a quick progression in the growth.

The time of pulling flax depends on many circumstances; if it is required for spinning it is pulled not long after the flower falls; if it is beaten down by rain, so that it cannot stand again, it must also be soon pulled to prevent its rotting; but, if it is to stand for seed, the flax must be fully ripe, and the heads well filled. Mr. Stephenson's opinion is well founded, that different growths ought to be pulled and kept separately, and appropriated to different purposes, for, the qualities being so very distinct, they will not work to advantage together. The next thing in the management of the flax crop, is the drying it; this is a very critical process, and requires great skill to be properly executed, and the proper time, when by taking it out of water the fermentation must be stopped.

Waters of different natures operate quite differently, as the warmth or cold of the weather

the same effect. From want of certainty in being able to distinguish the exact time of steeping, much injury is often incurred. Dr. Stephenson recommends ponds to be sunk in clay, four feet deep, six wide, and long according to the quantity of flax to be watered; if the soil is not clay, to have the pits lined with it, and so situated that a stream of pure water may be turned into them. These ponds should not be placed under the shade of trees, which cause a variation in the temperature, nor whose leaves are astringent; for they may discolour the flax. When the bark separates from the body, which is known by rubbing it between the fingers, then the process seems to be finished. For grassing, the next thing to be done, meadows are generally chosen, for one reason it would appear, that they are free from cattle; but, if they are rich and quick of growth, and wet weather comes on, there is a chance of rotting the flax, before it is sufficiently grassed; turning is the only remedy. Dry lea land is supposed to be the best, as the grass there does not spring so rapidly. When the flax is a sufficient time on the grass, which is found by the manner of its breaking and by the feel, it is dried, and put up until convenience offers to have it broken, either at home, previous to its going to the mill, or at the mill, where this work, called rolling,

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can be done. When this is performed, it is scutch and then is ready for the hackle. Here, until the seed is saved, the farmer's labour with it ceases; it then becomes a matter of manufacture and commerce.

When flax is intended to stand for seed, preparation of the ground and management the same, as already detailed, until the time pulling; for that, which stands for seed, must longer on the ground to allow the heads to ripen. When the pulling is accomplished, it is put into stacks, where it is allowed to stand for different periods, according to the manner, in which the seed is to be disposed of; if that is to be saved by spinning, which is performed by drawing the flax through a row of spikes fixed in a plank, it is required to stand so long as when it is to be put into a stack, because part of the drying is done by spreading it, after the rippling, on cloth exposed to the sun and air; but, when the stack is intended, it must stand in the field long enough to be so well saved, that no danger of heating ensue. If the sides of the sheaves are often turned, it will promote the speedy drying. When the object is attained, it must be put on a hovel to protect it from vermin, who are very fond of it; it may stand until the seed is wanted, when

be beaten out with flails. Those, who cultivate flax for seed, may be reckoned in general to sacrifice the former; but I have seen instances, where the flax was excellent; it was not watered in the usual way; it was spread, in the first instance, on the grass, where it was necessary to allow it to remain much longer than if it had undergone that process; but the effect was produce of a superior strength and fineness, and considerable in quantity.

The following paper published during the American war, upon the best method of cultivating flax for seed, was furnished to me by Mr. Waring of Waringfield, and is worthy of preservation, especially in these times, that threaten interruption to our intercourse with that continent.

An effectual method to raise Flax and save the seed.

“ Plough your land, if possible, before Christmas, the sooner the better; let it lie open till February, then harrow it and plough it again; let it lie so to the time of sowing, then harrow it again; pick off all stones, clods, scutch-grass and weeds; then roll it, and, if you have not a roller, the back of a harrow may do; then plough it a third time. Three ploughings are absolutely necessary; the first turns down weeds, the second turns them up,

and the third sinks them again, besides pulverizing the ground, and bringing it to proper tilth.

The next process is to dig one spade breadth each furrow, leaving the mould in the same place very fine; then harrow it carefully.

Next, the seed in apron, one handful of which is to be sown at 6 or eight casts, beginning at the left side and ending at the right; what is left in the furrows, or mould for covering, will be covered in the shoveling.

When the seed is sown, cover it from one to two inches deep with the mould, that is at the bottom of the furrow; the lighter the soil is, it should be covered the deeper; when covered, get the stones and clods into the furrows with the help of a rake.

Never roll it when covered; the horses or feet would thereby, in drawing the roller, put out of the seed out of its place, and cause no growth; also every stone or clod, trod on, will sink the seed below its level, and also break the sides of the ridges. Always sow on the level of last harrowing, and plough in two or three days before.

Many are the advantages of trenching.

1st, All sound seed sown this way will grow. 2d, There will be no after-growth.

3d, The stalk will be nearer one length and thickness; consequently will water alike; and not go down in dressing.

4th, Being totally covered, birds cannot get at the seed.

5th, The flax will not be apt to lodge, its roots being deeper fixed.

6th, The furrow is a lane for the air, so necessary for the vegetation, salubrity, and maturation of vegetables.

7th, The furrows are drains in wet lands, and also in dry, in times of heavy rain, without the least inconvenience.

8th, In driest weather, and in driest land, you need not wait for the appearance of rain; for, if properly covered, it will vegetate as soon in dry as in moist weather.

9th, You may sow earlier in this way than in that commonly practised; for, the trenches will carry off the great falls of rain or snow, which may happen, and so often destroy flax sown in the common way.

For the above reasons it may be affirmed, that, if this country can hope to sow its own flax-seed, it may be expected from trenching, as in this way we shall have flax earlier in the summer, and more evenly ripe; and it is thought, should this method

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be generally practised, Ireland would raise many thousand pounds worth more of seed than in the common way; and that for same quantity of land and less seed, at least fourth, which would be an annual saving of more than 20,000*l.* sterling in seed to this country.

N. B. By ploughing the poorest lands two or three times, or oftener, and beginning early, if possible a year before sowing, you may expect very good crops."

Produce. This is not to be taken from small patches usually sown after potatoes, but from an extended culture; in that case, from five to six stones may be about a medium. The weight is reckoned when rough, as they come from the mill, and are 16*lb.* each: about one-third of hackle may be the general proportion to the rough weight, the remainder is called tow, which is of inferior quality and is spun coarser. Of this there will be about another third, and the remainder is called bone of tow; this is spun into very coarse yarn on a large wheel, having been previously carded and manufactured into sacking and other cheap fabrics for which there is a great demand, so that little is lost.

The quantity of seed raised upon an acre may be rated at from one to two hogshead

Christy of Thircassock had eleven from six acres. The Sicilian flax-seed greatly exceeds that, but the flax is short, and inferior in quality; nevertheless it is worth attending to for the mere purpose of crushing for oil; from two and a half to three hogsheads may be expected; and for the oil-mill it is preferable to any other, being much larger. Flax is subject to a disease called firing, which often attacks it when near ripe; it appears on the stalk like a mildew. This is thought by some persons to be a parasitical plant, which by its fibres injures the texture of the bark. A gentleman of great research on these subjects threw out an idea, that it proceeded from the globules of dew, bringing the rays of the sun to a focus, and thus acting like a burning glass; it is with respect to flax as the mildew is to wheat; the instant it is perceived, it must be pulled. This substance, howsoever it may be acquired, and which by bleachers is called sprit, adheres so closely to the rind, that is, to the working part of the flax, as to have eluded all the future processes, if allowed to remain, of the old mode of bleaching. But there are two modes of removing it before the spinning, by scraping it at the time of hackling, or by putting the flax through an instrument, called a clove, now little used; this machine resembles, as Dr. Stephenson well expresses it, a pair of curling tongs upon a large scale,

scale, only that the cylindrical part is of w and the concave of iron. I shall take leave to on this important subject of flax, the support our staple manufacture, an extract of Doctor pihrenson's account of the means used to have very fine. "The seed is sown on old lea fall the last ploughing immediately before sow double the usual quantity of seed is allowed; this is done, forked stakes are fixed in the ground at each border, three feet distant; twelve in above the surface, a pole is laid across the into each fork; brush-wood or rods are laid the poles; these support the plant, and, with springs through them, prevent it from falling pulled soon after the flower falls, before the turn yellow, and laid on brush-wood to dry. for cambrick, four or five days will dry it; late, it must be perfectly dry; when the be struck off it is tied in beets, or bunches, so a man can grasp with his hands, before water it is made up in bundles, each bundle wrapped in straw, tied in the middle and at each end. with hooks are driven into the sides of the five or six feet asunder, level with the surface of the water. The bundles are then thrown in water, about twelve inches from each other; a line is fixed under the hooks at each side, along

hank; the bundles are pressed down by poles across the pond, each end of which is under the poles, parallel to the sides. Poles and brush-wood may be taken from any kind of trees, except such as have astringent bark. The intention of the farmer in these operations, is the production of fine filaments without stains; he therefore causes a small stream of pure water to pass through the pond during the time of steeping, and never allows the flax to touch the sides or bottom of the pond." It cannot be expected, that in this way the quantity of flax upon a given portion of ground will approach to that cultivated in the usual mode; but here quantity is not the object; it is to have a raw material, upon which ingenuity may exercise itself, and be in some degree compensated. I have already mentioned, that the produce in hackled flax is about one-third of the whole weight obtained; taking that, therefore, at between forty and fifty stones, fifteen will be about the quantity; but of this very fine flax let it be supposed one-sixth, or seven and a half stones; and this manufactured into yarn, such as Anne M'Quillan of Comber makes, whose story is so well told in the Belfast Magazine of March, 1809, of 64 hanks in the pound, and this wove into cambric, or made into lace; then some general idea may be formed of the value of such

such a manufacture, and the comfort, that must be the consequence, where the females of a family can have employment even in the coarser branches.

Of the effect of Bounties on saving Flax-seed

In the year 1809, very great exertions were made to save flax-seed, and the bounty here certainly gave great encouragement; for, the quantity, that received bounty in the whole kingdom was 61,864 bushels, which was divided among 26,027 claimants; of this the province of Ulster alone raised 35,927 bushels; of the different counties in Ulster, Antrim saved the least quantity, bounty being claimed only for 754 bushels; Donegal saved the greatest, the bounty being claimed for it for 8387. In addition to these quantities a great deal was saved, that did not amount to a quantity intitled it to a premium; but what proportion was, it is impossible to say; but it may have been considerable; and, had not the distinction been made of two shillings and six pence a bushel against the rippled seed, much more would have been saved, because few growers of small quantities could afford to let it stand unthreshed till the difficulty also of protecting the seed, was

separated, is greater, as nothing but the best constructed stands can keep the vermin from it.

Of the different kinds sown for seed, the Riga appears to have succeeded the best, the return from it being fully equal to the original; and its return in flax is not inferior, so far as I have seen, to any other kind. The idea of flax degenerating in this country, from want of a change of seed, I should rather be inclined to doubt, as there are instances of the same person raising his own without change for many years; but, whilst it can be cheaply obtained, it is not thought a sufficient object to risk the injuring of the flax. In extremity, however, we have the comfort to know that it can be done.

Potatoes.

The subject of this article has been so often treated of, and the different modes of management are so generally understood, that, in describing the practice of the county of Antrim, I shall not be able to offer much that is new. When ground is to be reclaimed by a potatoe crop, whether it is old grass ground, stony ground, turf bog, or ground that has been under timber, then recourse is had to the spade, and the old lazy-bed way is adopted; of spreading the manure on the sur-

face, laying the sets on the manure, and cover both out of the furrows on each side; and the potatoes appear in leaf, giving a second covering out of the same furrows. This second covering ought not to be given, until the shoot appear an inch or two in length; and, though in that state of growth the moulding process is tedious, from the fear of injuring the young crop, the expense of time is amply repaid by the produce. The advantage of this mode of culture is the bringing certain descriptions of ground to an immediate profit, which in any other way require much time, before any return can be expected; the disadvantages, great additional labour, and a comparatively small crop. A pound kind of culture, partly performed by the plough, and partly by the spade, is likewise used. The ground is prepared, as for drilled crops, by two or three ploughings and harrowings; but the manure is spread on ridges, and the potatoes covered, usually are in the lazy-bed way, out of the furrows with spade and shovel. This is a very productive mode of culture; and, although it consumes much labour, manure, and seed, it is thought to be worth all, especially on land that has been long in drill culture; as the spade, by going deeper into the soil, that is new, to cultivation, extending

nefits not only to the potatoe crop, but to the grain, clover, or grass that follow. From good authority I have been informed, that in the district about Malone, which for many years has been confined to the drill culture of potatoes, the soil now refuses the returns it formerly gave, not only in the first crop, but in those that are subsequent to it; and that the deficiency extends even to grass; in consequence of which the farmers have had recourse to this mode, which, by bringing a portion of the sub-soil to the surface, has remedied the evil, wherever it has been tried. But the drill culture enables the farmer, in the most expeditious manner, to cultivate the greatest quantity of potatoes upon a given quantity of manure; to substitute the plough for the spade; and during the greatest part of the summer it imparts the advantage of tillage to the growing crop; approaching, undoubtedly, near to the idea of perfect culture, and equal, it is thought, to that of any other country, when performed in the masterly manner of the barony of Massereene, where it was first attempted.

For performing the work of the spade with the plough, for extending a species of garden culture to fields, we are indebted to the sagacity and industry of Mr. Bullock, at that time a young farmer

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in Soldierstown, who seeing the success attended it in small pieces in gardens, done by spade and shovel, tried it in the field between fifty and years ago. His example was followed by Hammond, his relation, of the same parish soon spread amongst the neighbouring farms so that it is to the Hertford estate we owe most excellent introduction. The quantities of seed and produce are as different as the mode of cultivation; the lazy-bed requiring the most labour and producing the least quantity; but the drill in general is better, as they are firmer and longer in the seed, a great deal depends upon the quality of the sets; if taken off large potatoes, the quantity in bulk is more, though the sets are not so numerous. The time of planting on grass is in the month of April; in the other methods, through the month of May; and the time of taking them out of the ground depends both on the time of planting and on the season, and on the sort, some being earlier in ripening than others. They are generally put up in heaps in the fields, and are required for use, or that they begin to rot. If the heaps are small, they keep well; if large, they are subject to heat and to rot, and are both, and often too, the consequence of leaving them unripe. Potatoes, set in drills, are

generally taken up with the plough, which is a most expeditious and economical practice. The produce of grass land is not large, except in some very particular piece of ground; probably from two to three hundred bushels; in the other modes a third more. But the ploughed and ridged ground is thought to have the most. There are so many kinds, it would be impossible to enumerate them; every country has some favourite; but, for strong soils, the black potatoe had for many years the preference, though often infected with the curl; which, by a very accurate observer, has been attributed to a natural decay in the species, as is observed with respect to fruit trees, which, when they come to their stated time, never can be recovered by any art, and, though they will seem to revive and flourish for a year or two, are still hastening to their final period. This was observed to be the case with a white potatoe much in use about thirty years ago, called the London Lady, which is now completely gone;—new varieties, however, are still arising to supply the place of those, that perish. It has also been observed, with respect to this disease, that, if the crop of one year is remarkably luxuriant, the following year abounds with curled stalks.

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There is one more fact proper to be stated upon this subject; that, in changing the seed from boggy to other soils, it does not so often occur, and the practice of England confirms this. In Staffordshire there is a constant intercourse between the lowlands and moors for change of seed, which they reckon to have the wished-for effect in preventing the curl.

Crops not generally cultivated.

The neighbourhood of Lisburn has been long in possession of a very productive branch of cultivation, in raising cabbage plants of different kinds for market; these, as well as kail plants, are sown as a crop by the farmers in the neighbourhood, and retailed by them in the markets and at home; or they are sold, wholesale, to those who make it their business to carry them to the near and distant towns on the market days, in all the counties adjoining, often to the distance of forty miles. In dry weather they are carefully covered, to prevent them from being withered; and, being tied in bundles of one hundred each, they will keep fresh many days, and are thought not to be the worse for being out of the ground for the space of a week, taking readily with it, when they
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are set, provided they are not heated during the carriage. There are two seasons for sowing the seeds of cabbage; those, which are to stand the winter, with the intention of being planted out early in spring, must be sown about the middle of July at the latest; for, if they have not strength of root and leaf, they cannot resist the rigour of the winter. But to those, which are to be planted before winter, with the intention of coming into use very early in spring, a month more should be given, making the seed-time June; for, though a few will run up, that loss is compensated by the vigour of those that remain.

Spring is the other season for those seeds, to answer for the summer planting. The preparation for this first crop is often plain fallow; for, potatoe fallow is seldom ready in time, unless the ground is particularly favourable, as well as the weather, to get the first crop out; when this can be done, the profit is great, being three crops in two years; 1st, potatoes, 2nd, cabbage plants, which are off in time for 3d, barley. When these seeds are put on fallow, it is manured either with lime and soil mixed, or with well-rotted dung, which is better; the land is gently stirred with the plough; then it is harrowed, and the seed is sown; another slight harrowing is given, and the furrows are shovelled.

What

What is sown in spring generally follows potatoes. The quantity of seed, about twenty pounds to the Irish acre, the price from 6s. to 8s. per pound; it is all imported from England. The cabbage most in demand is the Early York, called here the Pomfret; the Sugar-loaf succeeds that; and for winter use the Savoy and Dutch cabbages; also the red cabbage for pickling. The price of an acre of cabbage plants is sometimes so high as thirty guineas; when provisions are dear, the price is enhanced, as they are the first vegetable for use in spring. The Scotch kail is in very general use, both as a garden vegetable, and as food for milch cows in winter, which makes a great demand for the plants; but, the seed being saved at home, the price is lower; for when the other kinds are sold for 6d. or 3d. per hundred, these are not more than one-half, or one-third of that sum.

In the neighbourhood of Belfast there are many cultivators of these vegetables, though not on a very extensive scale, both for that market, and for home consumption. Mr. Thomson, of Jennymount, informs me, that he has not found any thing more productive of milk and butter of the best qualities. Nothing can afford a finer food for ewes and lambs, than the sprouts of a field of kail, long before grass is ready for them.

Turnips

Turnips.

So long ago as the year 1776, this valuable root was cultivated at Shane's Castle. Mr. Young mentions the delight he felt at seeing four hoers at work there in the month of August, in that year. But it does not appear, that this laudable example was followed by the farmers in that country, nor that the gentlemen paid much attention to the subject until the beginning of this century. But it will be seen from the list, which is subjoined to this, how widely it is spreading over the county. In time, it is to be hoped, the farmers will follow the example, though in these things they are not prone to it. But this perversity is not confined to Ireland, as the following anecdote, by Mr. Marshall, will shew. A Mr. Pringle, who had retired from the army, first introduced the drill culture of turnips on the best system into Northumberland, where the former mode was execrable. He was ridiculed by the farmers, not one of whom followed his steps, though they saw the superiority to their own in the next field. But, when Mr. William Dawson, a professed farmer, adopted the same method as Mr. Pringle had done, being convinced of the advantage of the drilled over every other

species of cultivation hitherto given, from his practice the whole country came into it, not excepting the farmers, who before would not condescend to improve under the auspices of Mr. Pringle. To this country just mentioned, or to Cumberland, we are indebted in a great degree for the drill culture of this root, which was introduced into the northern counties by a steward of the bishop of Dromore, whose name is Mathew Gaskin, a native of that part of England; to this county in particular it is most admirably fitted; for the moisture of our climate is such, that, unless they were by drills raised above the surface, their roots might be injured long before they came to their growth, by which, both in quantity and quality, they would be inferior to what they now are. In addition to which it may be observed, that the step from drilled potatoes to any other drilled crop is very easy, and much more likely to be followed here, than sowing broad-cast, and hand-hoeing, which is a difficult operation to learn. The usual preparation for turnips, is to break up the ground as soon after harvest as it is convenient, laying it in broad ridges; in this state it continues until the most necessary operations of the spring allow of a second ploughing and harrowing; after this, unless the soil is very stiff or very dirty, the drills
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are made at about two and a half feet distance; the dung is then put in, in such quantities as the ground requires; the drills are scarcely as deep as those for potatoes, that the turnips may grow the higher, for the reason above stated; then the dung is carefully covered, and if there has been rain, or that it is likely soon to be, the seed is deposited from a drill barrow, and with a light roller pressed into the ground; after this, when the plants arrive at a proper size, they are either thinned by hand, or with a hoe, all the weeds being at the same time taken out. One or two ploughings are afterwards given to the intervals, as they are required. There is a difference of opinion, respecting the distance to be left between the plants in the rows; many persons preferring a greater number of small roots to a lesser number of large ones, thinking the small roots more close than the large, and not so liable, from that circumstance, to injuries from the weather. The kinds most in use are the Globe Turnip for the first of the season, and the Ruta Baga, or Swedish turnip, for the spring. Immense crops of both are raised, when they are sown in proper time, and well managed. The Globe does well, if sown in the middle or latter end of June; but the latter, to make a full crop, must be sown at least a month sooner, as it is longer before

before it establishes itself in the ground, being in its first period a slow grower. Most of the turnips raised are applied to feeding cattle for the spring markets, which are in every good town well supplied with beef at that season; but I must say, that the supply of meat, produced by this culture, is mostly from gentlemen's demesnes; the farmers feed theirs in a different manner.—From the attention, that some gentlemen have paid to ascertain the weight of an acre, by carefully weighing portions taken fairly from various parts of their turnip fields, I can say that the produce is often from forty to fifty tons per Irish acre—a very great yield indeed, but not uncommon. Respecting the number of beasts one acre will support, that very much depends upon their size, and the quantity of other food. On this, however, the goodness of the flesh very much depends, as well as the consumption of the turnips. One gentleman, who is reckoned to send the best beef to Belfast, gives turnips four times in the day, and hay five times. Of turnips he does not allow much more than three quarters of a cwt.; therefore the flesh of his cattle is much firmer, better coloured, and better tasted, than it would be, if he was more lavish of his turnips, and more saving of his hay. The white
turnips

turnips are generally carried from the field to the cattle, though in some instances they are stored up, for which purpose a shed, with walls of turf between the piles of turnips, is most useful, as it keeps them separate and prevents them from heating; they are sometimes kept in heaps in the fields as potatoes are, which, if the heaps are not too large, answers well. The Ruta Baga for the end of the season ought to be taken off the ground, that it may be prepared for its future destination. This vegetable is peculiarly valuable on this account, as it will keep until summer; and, if the cattle are off before it is finished, a better food for work-horses cannot be found; it is very nutritive, and nearly equal to carrots, which it rivals in the degree of sleekness it communicates to the coats of horses fed with them. In point of quantity also, that is superior to appearance, as the specific gravity is greater than that of the white turnip. When boiled and dressed, the Ruta Baga takes up at least as much space as it did before that process, the white turnip much less, having a superabundance of moisture, from which defect the former is free.

A yellow turnip has been much spoken of as excellent for keeping, and of a good quality; that turnip has been long in use as a garden vegetable,
and

and deserves the character given of it. The Ruta Baga has one defect; it is more uncertain, and the difficulty of securing a crop of it greater than of the white turnips; but it bears transplanting better; and, if a seed-bed is made a month previous to the general field sowing, it will supply any deficiencies in the drills; a seed-bed of these, of kail, or of cabbage, would be a good appendage to every cultivator of turnips, to be transplanted wherever these fail; the seed is not dear, nor is the trouble great; the profit certain.

The obstacles to a general culture of this most valuable article in the maintenance of farming stock are, first, the objections arising from the robbing the potatoe crop of the manure applied to them; but this vanishes in the second year, by contributing more than was required the first. The second objection is, the difficulty of preserving them from cattle trespassing during the winter; but, if they are put into the same inclosure with potatoes, and where wheat is to succeed (which must be inclosed) that would undoubtedly answer to keep them safe. The third objection arises from the fear of depredation; this would be a great one to the first sowers, but would cease upon their being more generally diffused.

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I here subjoin a list of those noblemen and gentlemen, who have by their example encouraged the cultivation of this most useful vegetable. I have endeavoured to have it correct;—if any are omitted,* it is from want of information.

Earl O'Neil, at Shane's Castle, where, according to Mr. Young, they have been cultivated since 1774, two years previous to his tour.

Marquis of Donegall, Fisherwick Lodge, near Doagh.

Mr. Adair, of Loughenmore.

Mr. Craig, near Carrickfergus.

Rev. Mr. Gooch, Castle Upton.

Mr. Thompson, Muckamore.

Mr. Stewart, Willmount.

Mr. Younghusband, Ballydrain.

Mr. Watson, Brookhill.

Mr. Conran, Trummery.

Mr. Boyd, Ballycastle.

Mr. Cuppage, Glenbank.

Mr. Stewart, Gracehill.

Mr. Montgomery, Benwarden,

Mr. Allen, Lisconnon,

Mr. Hunter, Ballymagarry.

Vetches

* Since the account of the turnip husbandry was written, I find that the under-named gentlemen farmers in the barony of Upper Masserene,

and

Vetches or Tares

This ameliorating vegetable, like the last-mentioned, is confined to the fields of gentlemen; I do not remember one instance of having seen it in any farmer's land, though I have so often traversed the county in every direction. Mr. M'Neil, of Larne, has cultivated them upon a large scale, and finds them very productive. In 1810 he had seven Irish acres. At Shane's Castle I saw them a few years ago, and, from the accounts of Mr. Lindsay's seed-shop in Belfast, I find they are spreading over the country. As an intervening crop between two crops of grain, they are the most easily introduced of any other, and are attended with the relative qualities to make them useful; they clean and enrich the ground in the first instance, and, in the second, maintain the farm-cattle in a superior manner; horses work well upon them, and cows milk well.

It does not seem to be ascertained in this country, whether there are two species of the brown-seeded

and in the neighbourhood of Mr. Watson, of Brookhill, have followed his example in the cultivation of that valuable root:—Mr. Garret, Mr. John Watson, Mr. Macgarry, and Mr. Robert Hall; and I am happy in having it in my power to add their names to the list of spirited cultivators.

seeded vetch, that, which is sown for the winter vetch, answering perfectly for spring sowing, and vice versa. The white is of course a different kind, but very delicate, and not so luxuriant.

The preparation is very simple, only one ploughing at the season most convenient. If they are for early spring feeding, they must be sown in September or October; and, to have a regular succession, the sowing must be continued at intervals until May, which will secure a cutting long after clover ceases to afford a supply.

One obstacle to the sowing vetches, is the quantity of seed, and the high price of it; four bushels are the general allowance; from fifteen to twenty shillings the price per bushel. This cuts deep into the profit; and to those, who know the advantage of the culture, it ought to be a great incitement to early sowing, to enable them to save their own seed, which in this way may be done, with a good season, and care; but, the more luxuriant the crop, the more difficult it is to save the seed. To sow oats thinly among the vetches keeps them from lying flat upon the ground, and rather increases the quantity of food, without injuring its quality, as, when the oats are green, cattle of all kinds eat both indiscriminately. A mode of managing their ground, by means of vetches as

a preparation for wheat, deserves to be recorded, as practised in the South Downs: it is that of substituting a double crop of tares, instead of a fallow for wheat. Early winter vetches are sown, these are fed off in the spring; the ground is then ploughed, and summer vetches and rape are sown, two bushels and a half of tares, and two quarts of rape; this is again fed off in time to plough for wheat. On this management Mr. Young dwells with pleasure. The land in its fallow year is made to support the utmost quantity of sheep (or cattle) which its destination admits; the ploughings are given at the best seasons, and between the times of giving those stirrings the land is covered with crops.

As a supply of food on a farm so far advanced in the best mode of cultivation, as to make clover part of its system for the summer maintenance of its cattle, in case of a failure in the clover crop, vetches form the best substitute for the deficiency of the other, which may always be perceived in time sufficient to apply these as a remedy.

Carrots.

A considerable quantity is raised in the neighbourhood of Belfast for the supply of that market.

The

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The soil in many places is well calculated for them, being a fine sandy loam. It is the garden culture, however, that is given to them; they have not yet found their way to the fields. Near Drum Bridge, they have succeeded with Mr. Stewart.

But the most extensive cultivator I have heard of is, Mr. Jones Agnew, of Killwalter; his ground, a fine loam, giving a most extraordinary return. I have not heard whether he perseveres in raising them.

Teazel, or Fuller's Thistle,

Has been raised by Mr. Wolfenden, of Lambeg, for the use of his blanket manufactory. Time of sowing is the month of April. He has not cultivated them extensively.

Rape,

I have not met with, notwithstanding so much of the soil of the county is adapted to it. It would be a treasure to farmers, whose land adjoins moors, moors, and mountains; and the soil, that best agrees with it, affords its own manure—a slight burning being sufficient to ensure a large produce.

Observations.

OBSERVATIONS.

The principal feature in the tillage system of a great part of Antism, is the potatoe fallow; to this it owes nearly as much as Norfolk does to the turnip fallow. Though the rotation of crops is not so regular, yet this is the general foundation, and to this the farmer always returns, to recruit his fields. The good farmer, in general, does not do away its advantages, but prolongs them by the introduction of clover, which is generally the fourth, instead of the third in the succession, where wheat is the second; but, where barley is the second, then clover is often the third. But the general course is—1st. potatoe, 2d. wheat, 3d. barley (ploughed for twice) or oats, fourth, clover; after the clover oats are generally sown, as they are found to be more certain than wheat.* Then the potatoe is again resorted to, and followed, in some instances, by wheat, flax, and clover. This is a better course than the first, as flax follows grain, and certainly is an ameliorating crop, besides being an excellent preparative for clover, not only from its nature,

but

* If clover was the second crop, the case probably would be different.

from the short space of time it occupies the ground. These courses of crops are followed by the good farmers; the others go on with crops of grain until the soil refuses to bear any longer, without rest or manuring again. As nearly as I can ascertain the proportion of potatoes to the size of a well-ordered farm, I find it to be between a sixth and seventh of the whole. If it is taken at a sixth, on a farm of sixty acres the account will stand thus: ten acres of potatoes; ditto of wheat or barley; the same of oats; ten of clover, one year old, and the like quantity of two; or instead of that grass; the other ten will be taken up with meadow, flax, garden, house, offices, &c. But very often, where the soil is in good order, five acres or more of oats or barley will be added, or the second year's clover will be broken up. In this situation of things, no cattle are kept at home during the summer, but horses and cows, the young beasts being sent to graze on the mountains. If to potatoes a few acres of turnips could be added, so as to make the fallow crops the fourth of the whole farm, the system would be nearly equal to the best farmed districts in England, and the turnips would restore, in the course of one year, more manure than there was in the first instance bestowed upon them, which is an advantage they have over potatoes.

It would be fortunate for the country, if the management, above mentioned, was not so much confined to particular parts, and if the erroneous practice of working the ground, so long as it will bear a crop, was not so much in practice. In the small farms, and in many large ones, it seems to be interwoven in such a manner with the system, if system it can be called, as to leave little hope of a speedy alteration.

The tillage of this county is generally performed by horses: where the land has been in cultivation, two are sufficient; where old stiff ground is to be broken up, three, and sometimes four are used, as also in giving the second ploughing for fallow, which is a laborious operation;—or where a greater depth is required than usual. Ploughing without a driver is daily gaining ground, where only two horses are used; it is not only a saving of labour in the person of the plough-boy, but it is favourable to the horses; they perform their work with much more spirit and cheerfulness, when the commands of the ploughman are communicated to them immediately without the interference of a driver.—Bullocks are used in some instances for draught, but they are not getting into general use; they are so slow, and are not well qualified for our hard roads. On farms sufficiently extensive, to allow
of

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of a few oxen to be kept entirely at home, it is an economical plan to employ them, as they are annually increasing in value, whilst they are paying for their keeping; but, from the size of farms, few can admit of both; therefore horses, being more adapted to general service, are preferred; and, where expedition is required, the advantage is greatly in favour of the latter, who perform one-third more in a given time. The farmers do not often wear out their horses; they buy them in young, work them whilst they are improving, and finally put them in condition, and dispose of them; which, from the great demand there has been for many years past, is easily accomplished, and to good profit. Employing them upon this plan, therefore, is an advantageous mode of management.

SECT. 2. *Manures.*

Farm-yard manure is the first object; this is mostly appropriated to the potatoe crop, and to a better purpose it could not be applied; in the first instance, affording an ample supply of the most wholesome food, and in the second, being one of the very best preparations for a succeeding crop of grain; extending its beneficial influence
also

also, if such be the course, to a following crop of clover or of grass. The general exertions of the occupiers of land to obtain as great a supply of this useful material as possible, according to their situations, whether they are large or small occupiers, are unabated through the year; and their great care in this point is visible in the increasing cultivation of the root, to which it is with so much advantage applied. Few opportunities occur of obtaining supplies of dung, farther than the produce of each farm offers, except in the neighbourhood of Belfast, where all the manure of every kind is bought up with the greatest avidity by the farmers, both of Antrim and Down.

In the smaller towns and villages most of the inhabitants are owners of some land, to which they appropriate what is made. The different kinds of manure, which are afforded by a large town, are particularly adapted to some of the soils about Belfast, which, being of light and sandy texture, receive great improvement from such as are in their nature rich and unctuous.

Great pains are also taken to increase the quantity of manure about the farmers' yards, by adding earths of different kinds, which certainly is attended with these advantages; that it prevents, by absorbing, the juices of the vegetable matter,

of

of which the dung is composed, from being washed away or evaporated. In the neighbourhood of turf bogs, the boggy earth of their borders is a most excellent addition. But I have not heard of that mode being practised, by which boggy earth and green vegetables are placed in alternate layers, until a considerable degree of heat is communicated to the heap, which, after standing a short time, is turned and converted into a rich and mellow compost, which may with advantage be applied either to turnips or potatoes, but to the former with more propriety, as the season of sowing them is that, in which green vegetables, weeds, &c. are more easily procured. In making the heaps of manure, I have observed that a great improvement has of late taken place; they are formed into squares, or such shapes as prevent too much of their surface being exposed. As to the exact time of applying farm-yard manure to the soil, there are many opinions. So far as I have been able to judge from experience and observation, it ought to be done after the putrifactive process has begun, and before it is completely over, so that the texture of the vegetable matter be not destroyed; for in this state its virtues are in more activity, and it can be distributed over the ground with less trouble, and more accuracy.

Lime.

The modes of laying on this manure are, 1st. on grass ground, where it is suffered to lie for one or more years, according to the purposes of the occupier; if for an improvement of the grass, it is excellent, the ground giving a full third more food than before the application of the lime. If the ground is meant for tillage, it is broken up as soon as it sinks within the sod, sometimes sooner; but that is not a judicious mode; for, it is too apt in that case to fall into the bottom of the furrow, from whence it is not so easily returned to the surface. One disadvantage of this application of lime is, that it makes the grass so strong, previous to the ploughing, that the crop of grain is sometimes injured by it, and always made more difficult to save from the quantity of it in the bottom of the sheaf. 2d. Lime on fallows: in this case it is laid on before the last stirring, and slightly turned into the ground, with which it completely incorporates before the next ploughing. Lime is also put on during the potatoe fallow; in this case it is wheeled in barrows between the ridges, and put up to the potatoes along with the mould. Many farmers plough up the

the head and foot ridges of their fields, put lime on the ploughed ground, then stir the whole together several times, during the summer months, and apply it, either in autumn, to their wheat crops, or in spring, to barley or oats. The quantity of lime put on is very great; from one to two hundred barrels, of three bushels each, to the Irish acre, on stiff clays. The late Mr. Lesly, of Lesly hill, used it in the largest proportion, and I have heard him say, he never found he had used too much upon his stiff clays near Ballymoney. On lighter grounds a smaller quantity will do; and when it is put on, either with the potatoe crop or mixed with earth, it will go further at the time; but the effects will not be so permanent. Whatsoever are the chymical effects of lime, they certainly cannot agree better with any soil than with the clays of Antrim; to lime, in a great degree, is owing the improvement, that has of late years made such a progress, not only in its immediate, but progressive effects; for, the quantity of straw produced by ground, that has been limed for the first time, is such as to afford winter food for nearly double the usual number of cattle: consequently near double the quantity of dung is produced, which being applied, in course, to extending the potatoe crop, (and other green

crops,

crops, if such there are) has produced the most beneficial effects. From the situation of the lime quarries, which are every where at the extremities of the county, the labour and expense of procuring the lime in the internal parts is very great; one day, two days, and often three days are consumed in going to, and returning from the kilns. These, when constructed to make lime for sale, are large, and turn out a great quantity, and are kept in for many months; in some cases lime is burned whilst salt is making; but in the mountains, where lime and turf are contiguous, the kilns are very simple, constructed in the rudest manner, and only calculated to burn the small quantity they contain at one filling; but, fuel being cheap, a sufficient portion of it is employed to make the lime good. Draw-kilns, when properly constructed, make lime in a more economical way, both with respect to labour and to fuel, than those abovementioned. The stone is not required to be broken so small, and the great acquisition of heat from the constant burning much facilitates the operation. These are kept burning the whole season by men, who relieve each other. The fuel generally used in them is either Ballycastle or Scotch coals.

Shells

Shells and Sand.

Where the situation admits of it, shells and sand from the sea shore are used with great success; near Port Rush the farmers are very skilful in finding out the spots on the strand, that contain the greatest quantity of shells; these are drawn off, and, according to the season, are immediately applied or kept for a future crop. I could not learn the quantity used per acre, but I think it is from 50 to 100 car loads, of six or seven bushels each; the effect is very great on all soils. Sea sand is also used even where there are few shells. The improvement on the stiff clays about Carrickfergus, where they have been tried, is most apparent. On land of Mr. David Kirk's, where sea sand was applied to one part of a grass field, and lime to the other, the sanded part was always picked as close as possible by all cattle, that approached it: this was at first attributed to the salt, of which they are known to be so fond; but their attachment to that part of the field remained long after the taste of the salt must have vanished.

In the demesne of Shanescastle, the sand from the shore of Lough Neagh was tried upon strong clay land, by the late Lord O'Neil, on a fallow,
in

in the year 1775 ; the wheat crop Mr. Young saw, and it was acknowledged to be the best, that ever was seen upon the land ; it was not limestone gravel, but the small pebbly kind from the shore. This is a strong proof of the utility of the application of substances different in their natures from the land they are applied to ; here was sand, from which every particle of earth was washed away, applied to ground, that was deficient probably in its proper proportion of that necessary ingredient in the composition of a fertile soil ; when this was supplied, see how beneficial the effect. Clay upon sand or gravel is not of less utility ; and the increasing use of it as an alterative, in the counties of Antrim and Down, shews that not only the practice, but the principles, upon which that practice is founded, are better understood. On the sea-shore wrack is also collected for the purpose of manure, when the season for burning it into kelp is passed ; those kinds, which are not fit for that purpose, are collected at all times ; they are in most instances put into heaps, allowed to rot, and then spread for potatoes or for grain ; the potatoes produced from this manure are reckoned watery. I have seen it in the county of Down applied as a top-dressing to barley and flax, when fresh from the sea ; the effect good.

Of

Of the Effects of Fire upon Land.

The effects of fire upon land, as a manure, do not seem to have been understood until of late years. That sod-burning, burning clay, and peat or turf bog, have long been practised with success, is well known to every person acquainted with the practices of husbandry in different countries; but the good derived has always been attributed to the quantity of ashes, that have been obtained, and not to the mechanical or chymical operation of the fire upon the soil; but to prove, that it is that operation which does produce the benefit, nothing more is necessary than to mention the substances used for this purpose, and the small quantity of them. Mr. Young, in that excellent book the Farmer's Calendar, mentions numerous instances of the crops of turnips obtained by manuring the ground in this way, particularly of a Mr. Richardson in the Wolds, a tenant of Lord Yarborough's, who has long practised the method of spreading straw upon fields prepared for turnips, and setting fire to it, thereby raising crops superior to those afforded by the usual portion of dung. The quantity of straw he makes use of is five tons; let it be supposed then, that these

five

five tons of straw were turned into five tons of dung (which is a large allowance) those five tons of dung would make ten good car-loads, a quantity not sufficient for the fifth part of an acre. The same gentleman found not only the turnip crop better, but the barley also, than what followed from the manuring with dung; and he is clearly of opinion, that it is the warmth from the fire, that has the effect, and not the ashes; for, the quantity is nothing, and would be blown away with the first blast. This straw-burning husbandry Mr. Young found again, at Belesby, practised by a Mr. Lloyd, an excellent farmer, who thinks that it will take six tons an acre, which will last longer in its effect, and beat the dung the straw would make. The Rev. Mr. Allington, at Swinop, has cut gorse (whins) and burned it in May for turnips; it also answered well, the effect great on the turnips, and on the barley better. In Gascony, and almost to Bayonne, Mr. Young observed the same mode of manuring for *raves*, a sort of turnip in use there. A similar mode of manuring has been a length of time carried on in the north of Ireland, though with a different and more substantial material; it consists in drawing the crumbly and friable parts of boggy grounds to the gravelly or clay fields in summer, then spreading it until it becomes dry, afterwards gathering

thering it in small heaps, setting it on fire, and, whilst it is flaming, spreading it on the grass; the effect of this on the grass is great, also on the succeeding crop; if it was used for a fallow crop, there is no doubt, the advantage would be much greater and more permanent. Whins I know to be a most excellent plant for this purpose, having seen the effects of it more than once; and, where land about to be improved is covered with it, what material could be better, or could it not be brought from rocky land, and burned where it is wanted on the arable? Nothing, when dry, has a stronger or fiercer flame, and from the harm it does where it stands, and the good it might do when properly managed, it is worthy of trial. The method of doing it is this, to spread the furze or whins, when they are properly dry, so that each piece may be in contact with another, and, in a short time the whole will be in flames.

Amongst manures in use in this country those, which are produced from the burning of clay, earth, and turf bog must not be omitted; in obtaining ashes from the first of these materials, much care must be taken to have the fire properly kindled at the beginning; when this is once done, and that a proper place has been chosen to afford a supply

of clay, there is no further trouble than to throw it on until the quantity required is procured; the best way is to make a kind of kiln with small flues and sod walls, to keep the fuel together at the beginning, and to keep in the heat; and, if it is so situated that a layer of bog can now and then be thrown in, it will much assist the burning; dry clay ought to be used at first; when that is red hot, throw on more by degrees, as it is able to consume it; and, when that is once properly done, it wants no other attendance than to give it a supply in the morning and evening; when that is omitted, it goes out of itself. From observation and experience I know this to be a most valuable manure, especially upon light soils; it is good for grass, for grain of all sorts, for flax, and for potatoes; the quantity of the latter, raised from this manure in the year 1801, was very great, as every method was taken at that time to supply the deficiency in dung, which arose from the scanty crops the preceding year. For potatoes the same quantity is required, as of dung; and these ashes answer best for raising them on grass ground. When the kiln or heap is opened, it has the appearance of the rubbish of a brick kiln; but the ashes fall with the exposure to the weather, and incorporate with the soil. Earth is more easily
burned,

burned, and those accumulations at the turning ridges could not be disposed of in a more advantageous manner, than by turning them into ashes. Turf ashes have long been a favourite dressing for arable and grass lands; their use is well understood; but the substance, of which they are, suffers more diminution in the burning than either of those above mentioned: if, therefore, a mixture of either can be obtained, a great acquisition of quantity is the consequence. I have been particular in mentioning those manures, which are within the reach of most farmers; as the drawing lime is to some situations a most serious undertaking, two turns consuming nearly a whole week, as I have mentioned in the article on lime. The combining the boggy earth with different substances ought particularly to be attended to; and, as many of those substances are furnished by every farm-house, I shall take notice of them here. First then, every farmer should have the bottom of his dung-hill covered with this earth, which will completely absorb those juices, that otherwise are washed away; secondly, he should have another portion, to which all the urine of his cow-house and stables could be conveyed, and all the different enriching substances which his house affords; and lastly, a heap ought to be formed in summer

to

to be mixed with alternate layers of fresh weeds, and such other vegetable substances as by fermentation will communicate a degree of richness to the whole mass. By such management as this, twice or thrice the quantity of manure might be procured, which, by giving every year an additional quantity of straw, would bring the cultivation of a farm, where such a system is adopted, to a high degree of perfection.

SECT. 3. *Grass.*

Natural Meadow and Grasses.

The surface of the county of Antrim, and the soil, are favourable for grass. The surface abounding with extensive plains and vallies; and the soil being strong and retentive of moisture; along the shores of Lough Neagh, and on each side of the streams which run into it, are tracts of grass grounds of great value: at the bases of the mountains also, in many parts, lands of a similar description are to be found; but those grounds, which lie low along the shores of Lough Neagh, as far as Tome, are much influenced in quality by the time of the subsiding of the waters. If this happens early in spring, a sufficient period may be expected

expected for a luxuriant growth, and an opportunity of making that growth into hay before the autumnal rains come on; but, when it is otherwise, the crop is of little comparative value. A considerable expanse of this kind of ground lies about Portmore, in lower Ballinderry, valuable both for grazing and for mowing; that part, called the Tunny meadows, is generally appropriated to the latter purpose; and, in favourable seasons, the crops are great, and the quality good. On some of these rich bottoms, horses are taken in for a longer or shorter time at so much per month; and they are found to thrive, if the grass is sufficient, nearly as well as in salt marshes. The grasses, that stock these meadows or pastures, are the fiorin (*agrostis stolonifera*) the *alopecurus geniculatus*, and the *festuca fluitans*; the first on the more elevated parts of the plain; the second and third in the hollows, where the waters continue longer. The *agrostis* is here in its element, in a rich, deep, and moist soil, and occasionally irrigated; but, from the circumstance of the situation being liable to be flooded before winter, it cannot be allowed the full time to complete its growth, neither could it be allowed to remain as green food for cattle in winter. The plains, which lie to the west of Belfast, afford a specimen of the grass grounds
formed

formed at the bases of the mountains; these, like the first mentioned, are deep, rich, and moist, and, when managed with care and attention, are highly productive. Tracts of this kind of ground, more or less extensive, are scattered at the bottoms and throughout the openings of the mountains in every direction; but they are generally much neglected, being left to the coarse productions, which nature has furnished. Accordingly these meadows are overrun with rushes (*tunic*) both of the common and jointed species; with water-mint, (*mentha aquatica*) blue buttons, (*scabiosa*) crowfoot, (*ranunculus arvensis*) flaggers, (*irides*) and many other weeds equally hurtful to the quality of the hay. Could the possessors of these grounds be prevailed upon to break them up, to drain them, and afterwards to lay them down, in this improved state they would be doubly valuable; and, as their situation frequently admits of irrigation, they might be kept in a state of progressive improvement. Near the mountain of Slemish, I am informed that a successful attempt has been made in this way, which example, it is to be hoped, the neighbourhood will follow.

As a stock of hay is so essential to a farm, I should not advise the whole of the meadows to be broken up at once; let one-half be taken, and,
when

when that is completed, the other may be done. But some of the finest and most productive meadows are those, which lie on the margins of turf bogs, where the junction is formed between the boggy earth and the loamy soil or clay. The mixture of these substances, whether by nature or by art, forms a compound soil, of which the fertility, in grass especially, is very great; vast additions to these might annually be made, by cultivating those portions, that are cut over for firing, either by burning and levelling, or by setting potatoes in them, and sowing them with seeds, or stocking them with florin, a grass for which too much cannot be said, provided it is confined to its proper station, which, I must repeat so far as I have been able to observe, is a soil inclined to moisture, or which can have the advantage of irrigation.

In laying out grounds for meadow, the rye-grass (*lolium perenne*), and the white grass, (*holcus mollis*) seem to be the favourites; why that is the case I do not know, as many others are equally good. The first has undoubtedly one great recommendation, its earliness. I rather think the latter has obtained a preference from the facility, with which its seeds are obtained; though upon the whole it is a good grass, especially in bog, from
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whence the purest seed might be got. by gathering it with the hand. The merits of the meadow foxtail (*alopecurus pratensis*) being so well known, as one of our earliest shooting grasses, and possessing the quality of bearing numerous leaves, it is extraordinary, that more attention has not been paid to its propagation, as the soil is particularly favourable to its growth.

But, whatsoever care may be taken in selecting grasses, a variety of species will appear in every field; and that most natural to the soil must ultimately predominate. The natural progress of land, laid down for permanent grass, seems to be this: by sowing seeds of any particular species, for the first year or two that will be the prevailing, whether it is natural to the soil or not. If, however, it is not congenial to it, it disappears by degrees, until it is completely overcome by its more vigorous adversaries, to whom nature has decreed the possession of the soil. Thus, if moist low ground is sown with rye, or any other grass, the production of a dry soil, in a year or two the *agrostis stolonifera* will gain possession, notwithstanding the advantage given to the first; and on dry soils the grasses indigenous to them will also gradually get rid of any intruder from ground of
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an opposite quality. Nature may be assisted, but will not be forced; therefore soil and seed should be adapted to each other, or no permanent advantage will follow.

Hay-making.

Every country has its own method of making hay, to which it is attached, and which it thinks to be the best. In the northern counties, the practice of shaking the grass out the day it is cut, turning it the second day, and making it into very small light cocks, and in that situation allowing it to remain, until it is sufficiently dead, to permit it, by one day's work, to be put into large field cocks, is generally followed; and with some variations, according to circumstances, it is well suited to this climate, and to the succulent herbage it produces. When the grass is not particularly heavy, nor very green when cut, it may with greater propriety be put into those little cocks (provincially named lap-cocks) the day that it is cut, which answers the double purpose of preventing the exposure of too great a surface, either to the sun, or to rain, if it should come. When this cocking is accomplished on the first day, the little

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heaps

heaps may in a day or two afterwards be turned, which much assists their drying, and prevents them from growing yellow underneath. Though the operation of making the grass into lap-cocks is so well known, yet, as it is allowed that to it we owe our best hay, I shall here describe the manner, in which it is performed, as concisely as I can. One person goes along the shaken-out grass with a rake, generally beginning at the outside, and with the wind in his favour, so as not to have the grass blown upon the raked ground; this person rakes in as much from the ground as can be reached; then a small arm-full of the grass, which by the first was gathered into a ridge, is taken by another that follows closely, who, having shaken it, forms it with the hands, assisted by the knees, into a small round heap, with an opening that passes through it, and it is then lightly laid upon the ground. As many pairs may be employed in this work as are necessary to lap-cock in the course of the day the whole of what is cut. On this part of the process of hay-making being judiciously performed the quality very much depends; for in wet weather, only a small part of the surface is exposed, whilst, from the lightness of the cocks, every blast of wind, during dry intervals, will pass through

through them. As a proof of this, it often happens, that hay, in this stage, though not completely dry, will come out after heavy rains perfectly free from injury. Nothing can be more manageable than hay in this form; during showery weather it may be moved with ease from the place, where it was first laid, to the intervals that are probably drier than where it stood; or it may be shaken and lapped over again. A longer or shorter time is given to the grass, to fit it for large cocks, according to the weather, and to its nature; if the meadows are upland, then less time is required, because the produce, partaking of the nature of the soil, has not so much moisture to part with, as that of the lower meadows. The hay having remained in this situation certain days, according to circumstances, is then carried into plots, and well shaken, in such portions as are deemed necessary to form the large cocks, which are made of such a size as is thought consistent with the safety of the hay, from half a ton to 15 *cwts*. Whilst the hay is receiving the benefit of the sun and wind in this situation, the workers are employed in raking the meadow, and carrying the rakings on to the plots; when this is done, the whole is turned, beginning at the lee side of the field; and, as soon as that is over, the cocking commences.

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When this is finished, the hay is considered as safe, and remains there until it is carried into the stack-yard. In the English method of making hay, it is taken in, and made into large stacks about the same period that hay in this county is put into field-cocks. Where this can be done with safety, it is a great saving of labour, but here the moisture of the climate is such, that the grasses are too full of juices, to allow of this rapid management, which often in England is attended with effects destructive of the crop. Too great a length of time is generally given for the cocks to remain in the meadows, by which a very serious loss of hay is incurred, both in the bottoms, and on the outsides; this proceeds from the fear of its heating, which, if not very violent, would be a much less evil, if it is an evil, than the quantity wasted in this slovenly way. One great defect in the management of our meadows in general, and which those about towns are free from, is preferring quantity to quality, by letting the grass remain too long before it is cut; all the leafy parts are thus lost, and the after-grass, that great resource to the farmers, is sacrificed.

Laying

Laying down ground for meadow.

The most approved method of laying down land for meadow, is by sowing whatsoever gras-seed is fixed on with the crop, that follows either a potatoe or turnip fallow; for, after this preparation, the soil is rich, clean, and finely pulverised. Barley is the fittest grain to be sowed with it, as it remains a shorter time than any other species; but sowing the hay-seed with flax is reckoned the best method, as it remains even a shorter time in the way of the grass; and the pulling of it is certainly an advantage, as it loosens the soil, and by the mould, which is scattered from its roots, gives nourishment to the young plants. On stubbles I have more than once seen hay-seed harrowed in by itself in autumn, and with great success; the ground was first refreshed with a large harrow, the seed covered with a small one. This is a great resource, when seed has failed in spring, or when a new plan for a field may be adopted. As there are many excellent grasses, the seeds of which it is very difficult to procure in any great quantity without adulteration, the only mode of doing this is by selecting with the hand such as are wished for, and

and cultivating them in drills, carefully eradicating all intruders, until a sufficient supply is obtained : when that is accomplished, the greatest attention must be paid to the state of the ground, where it is to be sowed ; otherwise, in a very short space of time, the natural grass will make its way, and which in the end it will do, if more congenial to the soil, in defiance of all efforts. In this situation of things the only way is to submit, and to encourage by manure, and other good management, what nature throws in our way. I shall now proceed to mention some of those grasses, to which I have paid particular attention, with their good and bad qualities, and the soils on which I have observed them in the greatest luxuriance.

Alopecurus pratensis—*Meadow foxtail*. This I have observed to grow with the greatest vigour, and to a height I never saw in any other situation, on the stiff clay of a new-made ditch in the parish of Killead, not far from Mooregrove. I have observed it also in the same country, in the meadows, overtop every other grass ;—it grows in Mr. Legg's demesne, between his house and the road ; the bottom of that ground, I think, is clay. It grows, in the demesne of Moira, in the clay that covers the limestone ; and, though the ground has not been broken up for many years, it is of
superior

superior length to any of the grasses, that surround it. In some of the sandy fields about Lisburn it grows, but there it is a pigmy, compared to the other situations. I have seen it very fine near the road from Belfast to Dunmurry by the Falls; this is in clay. This grass, therefore, is peculiarly well adapted to the county of Antrim; in itself it is a most excellent plant; it shoots very early, has plenty of leaves, of a soft succulent kind, high on the stem; and, with a moderate share of attention, the seeds might be easily gathered, as the ear out-tops every other grass. In hay the seeds are never found, as, from its ripening so early, they fall before the other grass is fit to cut.

Cynosurus cristatus — *Crested dog's tail*. This is the grass, which goes by the name of windle-straw: it is a good plant, and makes one of the many, that clothe our fields. In most soils and situations its ear contains a nutritive seed, and has numerous leaves.

Dactylis glomerata — *Cock's-foot grass*. This is now much esteemed in England, though Mr. Sole, in the Bath Transactions, says that cattle refuse it;—in Ireland they do not: it is a productive plant, both in stem, ear, and leaves, but it is hard;
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and, if it was cultivated alone, it ought to be cut very early; in that case it would fully repay, by producing an increased quantity of after-grass, as it is the first to make its appearance after the raking of the meadows. Its quality of growing under trees makes it particularly valuable for orchards, from whence it derives one of its appellations. It seems to be a favourite of all soils; and, even where the rock is near the surface, it does not appear to be stunted in its growth. It abounds near Lisburn, and, from its marked appearance, the seeds might easily be gathered by hand.

Festuca elatior; a strong grass, worth cultivating on deep soils—in all our meadows of that nature.

Festuca loliacea. Like the former in its choice of a deep soil, and in its appearance not unlike the rye-grass, but much broader in the ear, and later in coming into ear; it is only in blossom, when the latter is fit to cut.

Festuca pratensis. Excellent for both pasture and hay.

Festuca fluitans—*Float fescue*. In ground, where this grass naturally grows, it would be injurious to the possessor to break it up; yet few persons would be inclined to turn ground into a marsh to raise

raise it on. I mentioned it as one of the chief productions of the meadows, that are annually overflowed by Lough Neagh. In the meadows near Toome, on the Derry side, it grows also with a luxuriance scarcely credible, there being barely room to make it into lap-cocks without their touching each other. The hay is soft, but good, and, when made in the sap, is of a bluish green colour, and grateful to all cattle, as is the grass when uncut, being always cropped to the ground. As the grounds favourable to this grass are often liable to be overflowed by the autumnal rains, from which an early cutting can alone save it, it is often spoiled for want of this precaution, not so much from the injury done by the water, as from the sand and mud, which it leaves behind it; so that the cattle, who are compelled to eat it, are often seriously hurt by the mixture of these substances with the hay. But year after year the same management is seen in the same fields. This may be supposed to proceed from that happy propensity to hope, which mankind possess, that, if they are unfortunate this year, the next they will not be so. The seeds of this grass are supposed to be very nutritive, and are eagerly sought for by all water-fowl.

Alopecurus geniculatus; called so from the bend of the joints being like the bend of the knee; this is also fond of moist situations, though it will grow in others; it is one of the grasses, that throw out roots from the joints, and may be propagated by slips; it is also a creeper, never rising high, but growing from the centre in a position nearly horizontal, the lower joints always touching the ground. I have never heard of this grass having been cultivated; in its congenial soil it grows spontaneously; and, when the hay harvest is arrived, it largely contributes its share in the general mass, where it may easily be distinguished by its bending joints, light-green-coloured leaves, and smooth round ear.

Agrostis stolonifera (*joint-grass* of the farmers,) Dr. Richardson's *fiorin*. This grass it would be unpardonable to pass by without particular notice, not only on account of the celebrity given to it by that learned gentleman, but also from its intrinsic good qualities, when soil and situation are adapted to it. The plant is a creeper, and, like all creeping plants, it throws out roots and buds from the joints of its trailing stalks, that sprout forth in all directions, forming around it at last a complete mat upon the surface; it is constantly, during the season of its growth, productive of new roots from its knots,
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which give a new supply to the shoots, that proceed from the same; for, the instant these roots break out, the bud is perceived in the contrary side. About the latter end of July, or the beginning of August, this grass begins to shew its ears earlier or later, according to the time it was cut or fed, the preceding year, being more or less protracted. These ears, which acquire more erectness than the shooting leaves, arise in general from the old roots, that were established in the ground, and are not very numerous; at this time, in the old method of management, in meadows that were formed by nature (for then there were no others) the grass was supposed to be in its prime, and fit for cutting; and, though it was well known that a much greater quantity could be obtained by letting this grass remain longer on the ground, it was by those, who thought themselves the best managers, supposed to be more than compensated for by the superior quality, and by the crop of after-grass, which an early cutting always insures. For, respecting its quality, it was observed that the leaves were always injured, and often destroyed by their incumbent position, when suffered to remain long uncut, and that the after-grass was comparatively little. These were the ideas that prevailed respecting these natural meadows, where
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the florin was the principal herbage, and where it was not planted by the hand of man; for, at this time its cultivation was not even thought of; but Dr. Richardson has discovered and shewn, that this plant contains a vital principle, which not only promotes its growth long after other grasses, that have perfected their seeds, cease to be productive; but that this vital principle preserves it unhurt at seasons and in weather, that are destructive to the other species; that this principle is contained in the stalks or strings, and in the knots, and that their increase in length fully makes up for the injury sustained by the leaves from bad seasons.

From these observations he has made his hay (greatly exceeding in quantity what was the result of an early cutting) at a much later period than it ever was done before, and even in frost and snow, without injuring the quality; and has also used the grass newly cut as green food, with much advantage, to a period as late. These are Dr. Richardson's observations on the general tendency of this grass; and I understand, that several gentlemen have followed his example in this late making of hay, and with success; but, as to its use as green food, I have not heard of any other trials. With respect to the fact, however, that
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can make no difference; the testimony of Dr. Richardson, and the number of respectable witnesses, who have seen his experiments, place it beyond doubt. Taking, therefore, these positions as established; that by this mode the quantity of food is increased, and the quality not injured, and that a supply of green food is secured; we may proceed to inquire, whether the propagation of this grass is likely to be as extensively useful as he expects it to be. But, coinciding as I do with Dr. Richardson on the general principles of the nature and utility of the florin, there are some points, on which I must venture to differ from him. And first, respecting its introduction into boggy ground, there it is most happily applied, provided that the soil has had previous culture, not only from the constant supply of moisture, which facilitates its taking root, but from its manner of growing, which gives a firm surface to it so quickly; if, however, the soil is not in itself rich and well prepared, though it will exist, and even make efforts to spread, it will not be productive. Of this I can speak from experience, having planted a piece of boggy ground without any other preparation than digging it, between two pieces, that had been manured, and had borne potatoes the year before; the former is poor and languid, scarcely
covering

covering the earth, whilst the latter is close and luxuriant; and, in addition to this, I have had numberless opportunities of observing the same event in a country, that abounds with reclaimed bogs. My conclusion therefore is, that it must have a situation, rich either by nature or by preparation.

In the second place, I do not consider it as adapted to a dry soil; it will grow there certainly, and on the sides of the potatoe ridges, and in the furrows between ridges of corn, to a considerable degree of luxuriance, and to the injury of both crops, while from shelter the ground is moist, and from cultivation loose; but, as soon as it is deprived of these auxiliaries, it dwindles away, and at length is overcome by the grasses of a dry soil. A strong instance of this occurs in a field of my own; the bottom of it is a fine, moist, and mellow compound of bog and clay; there the florin flourishes with the greatest vigour; the other parts of the field are high and dry; there, after the first year of laying down, it has never shewn itself. The whole field was, many years ago, sowed with rye-grass; no florin planted, where it now abounds. From this experience, therefore, and from general observation of similar circumstances, I consider it as out of its place in dry situations,

situations, unless that (to it a) defect can be corrected by irrigation. The next point on which I have to observe is, that, although it flourishes on the sides of rivers, which occasionally overflow, there it cannot be treated in Dr. Richardson's manner; because, if it is either kept very late uncut, for an increased crop of hay, or as green food in winter, it will in all probability be spoiled by the floods, which, though they may not injure the vital principle of the plant, will so corrupt it with the deposit carried down by them, as to render it totally unfit for food. In this situation, therefore, recourse must be had to the old method of treatment, as a security against a total loss,—namely, an early cutting.

To these remarks I must add, that in planting it a great point would be gained, if that was performed by slips from the old roots, instead of the strings; these establish themselves much quicker in the soil, and are better prepared to throw out the runners; in this particular resembling the strawberry, that, when managed in this way, bears fruit the first year, whilst, by using the runners, it is not produced until the second.

The method of propagating and managing the fiorin having been so fully and so clearly stated, and so extensively circulated in the various tracts
upon

upon the subject,* I shall trespass no longer on the reader than to say, that under proper directions and limitations it seems to be the very best instrument, that can be employed in the improvement of the numerous mountains and bogs, that Ireland contains, but that cultivation and attention to soil and situation are required. On those high grounds, whose climate and moisture are enemies to the ripening of grain, there it would be in its element, and in most of them irrigation might be introduced as an additional improvement; on bogs it would not be less beneficial, its manner of growing, as it has been observed, being peculiarly adapted to form a firm surface upon them. But for its reception a careful preparation must be made, in most situations and in most soils, on
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* It seems extraordinary, that the agrostis should ever have been mistaken for the couch-grass, (*Triticum repens*.) One forns its roots and shoots on the surface, the other under it; one is a creeper, the other is upright, one has a close flat ear, the other a round spreading one &c. &c.—In weeding the florin, it is as necessary to extirpate other grasses as to destroy weeds, if the florin is either meant for a late crop of hay, or for green food in winter; because other grasses, coming to their period of growth sooner than this, and not possessing the vital principle which preserves it, first die and then rot; tainting every particle of florin, that comes in contact with them; this observation I saw completely verified last winter, where there was a mixture of the poa trivialis with the florin. At Mr. Joy's, at the Lodge near Belfast, is a piece of florin worthy of inspection.

its first introduction; after that, in those congenial to it, it will continue to flourish as it does, where it spontaneously grows. To Doctor Richardson's discussions we are much obliged for holding up to our eyes an object, that was constantly under them without our perceiving one half of its advantages.

Holcus Lanatus, (white grass with woolly stalks.)

This grass is a favourite of moist and boggy soils, where, in any rich spot, it grows without cultivation in large tufts or bunches, producing great ears, nearly resembling the white grass (*holcus mollis*) but far exceeding it in size; it is in part a creeper, for the lower joints often throw out both roots and buds. It grows well by slips, but it has not the long strings of the florin; the seed is so conspicuous, and in such large quantities, that it might easily be gathered for sowing, and, I am certain, in some soils would prove a valuable acquisition. The *holcus mollis* has already been mentioned under the head of laying down for grass.

Anthoxanthum odoratum (sweet-scented vernal grass) is another favourite with boggy soils, where it grows with great freedom; raising its slender stems and yellow ears to a much greater height than in dry grounds, though in them it is found in as great a proportion as any other; this is one

of the first shooting vernal grasses; but it bears no leaves on its stalks, these growing all around the root. Except for its earliness, it does not appear to be a vegetable of any particular value; the seed might easily be collected in purity in bogs, that have been cut over and levelled.

Phleum pratense, (*timothy grass*.) This grass is found so generally in this county, that the idea of its having at first been imported from America seems not to be correct; this is rather a hard and late grass, but very productive; crops of it, that I have seen about Moira, from seed imported by Mr. Jellett from the neighbourhood of New York, were as great as any crops I have ever seen of any other species, and the hay seemed of very good quality; but it was cut, before the seeds were perfected. It is not likely to spread much, as the seeds are not ripe at the time the other grasses, which grow along with it, are fit to cut. In late and wet seasons it is always most plenty. There are many other kinds, which, if properly attended to, might prove valuable acquisitions; but the difficulty of obtaining and of keeping separate their seeds is so great, that there are little hopes of deriving advantage from them; of these the *poa trivialis* and *pratensis* are amongst the best, as they have all the qualities requisite for meadow or
pasture.

pasture. They are fit for most soils that are in good condition, (a necessary requisite for all crops) whether they are moist or dry, clay, loam, or sand.

With respect to cutting the grass, from whence seed is to be saved, the precaution of having it sufficiently ripe ought not to be neglected; I shall, therefore, add a few observations on the subject. When the ear first comes out, it is close; by degrees it is developed, and soon shews the blossom gradually from the top to the bottom; the impregnation of them takes place as soon as that is accomplished; the ear again begins to close; the seed fills and then ripens; by the time that is over, it is nearly of the shape it was at its first appearance, but the colour is altered from a delicate green to a brownish yellow; the seeds are now full, and may, (if well saved) be depended upon as good, which cannot be the case, if they are not completely ripened.

Another precaution is absolutely necessary to be attended to, that hay must not be allowed in any degree to be heated, if the seed is kept on it; nor, if it is threshed off at harvest, must it be allowed to be suddenly put together; it must be spread, until it is completely dry; for, it is liable to be spoiled by a very slight degree of heating, its minuteness and the delicacy of its texture not enabling

abling it to resist the least fermentation, which in every species of seed is so destructive of its vegetative powers. In saving the seeds of grasses, some farmers are so careful as to tie the whole of it into sheaves, and to manage it as grain is managed, letting it remain in stooks until every danger of its suffering, by being too quickly put together, is over; there is great additional trouble in this method; but the advantages are supposed to pay for it, as none of the seed is lost by the shaking of the hay, and, from the exposure of the ears to the sun and the air, the process of saving is much accelerated.

Before the subject of hay is dismissed, I shall make some observations on the produce and expenditure of this necessary article in the farmer's catalogue of food. If cattle are put up for fattening, or cows are in full milk, they must be fed in the best manner; in the first case, hay alone will seldom do, though it is the dearest of all food, and in milk the produce of an acre will make less than the first cost; for, a cow fed on hay alone will consume the whole of a tolerably good acre, generally speaking, and after all will not give much milk. This produce of hay may be from two to two and a half tons per acre, which is in all situations, one year with another, worth from
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four to six guineas; this added to the summer's grass makes from seven to nine guineas for the year. Every farmer, therefore, ought to be provided with some other food, which, though at first it may cost more, will, in the end, be more economical than hay alone in the maintenance of his cows, and much more profitable from what they will consequently produce.

To keep cows on straw alone, that are either giving milk, or that are to give milk in the following summer, is not doing them justice; but, when to straw green food is added, this feeding is far preferable to hay without green food, and by this mixture the ground, that has already paid in grain, will pay more in the maintenance of the cattle than the hay of an equal portion of ground, that has produced nothing else. Therefore, a portion of turnips, cabbage, kail, or rape, ought always to be at hand, not only as they afford a much greater weight per acre, but as means of turning the dry food of the farm to the greatest advantage. I have seen young cattle in a yard, kept on straw and some turnips, better looking in spring than the best hay alone can make them. The only probability of making grass-land come near to the value of a green crop is, by converting it to the florin culture, which so much increases the quantity, and gives also the advantage, like the other, of succulent food through the winter.

SECT. 4. *Feeding.**Grazing.*

Tillage of late years has increased so much, that a considerable portion of the best grounds, which were appropriated to grazing of cattle, are now under grain; yet, from the nature of the country, there must still be a large proportion of it dedicated to that purpose. The mountains and high lands, which either are not, or cannot be cultivated, are not useless, being always stocked either with the cattle of the proprietors, or with those taken in from distant owners, who are able to support a greater number in winter, than they think profitable to maintain at home in summer. The stock sent to the mountains mostly consists of young beasts, from one to three years old; if they are heifers, they generally return home in calf the third year. Many of these farms also belong to people, who buy in heifers, at two years or three years old, and keep them until they are near calving, when they are sold out at a very good profit. Many bullocks also of different ages are kept; they are usually bought in at an early period, and are sold out, either fat, from better soil
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which is reserved for the last year, or lean to be finished by some other owner. Much of these grazing lands lie to the north and west of Larne, extending towards Ballymena and Ballymony, and about Broughshane there are large farms occupied in this way. The lands are not often of the best quality, and, being uncultivated, they are set cheap, so that a good profit, especially of late years, has been made of them, since the price of cattle has been so much increased.

The grazing system upon the superior soils consists in buying in cows or bullocks in spring, or sometimes in the autumn previous to it, either in the fairs and markets near home, or in distant counties, and selling them off fat in the beginning of winter. When cattle are bought before winter, they are generally kept in grass fields, that have been saved for them, where in hard weather they have hay, a very small portion of which keeps them to their flesh, when added to what they gather for themselves. To cattle, that are managed in this way, a meadow of fiorin, cut as it was wanted, and given in racks or cribs to prevent its being wasted, would be a great treasure. It has been observed of cattle treated in this way, that they come on in fattening as well as those, which are housed. This may be owing to their not receiving
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any check by change of temperature on their first going into the finishing grounds, which in some degree must be the case with all creatures passing instantly from the cover of a house to complete exposure. Cattle, that are in high condition at the end of the year, may be kept well to their flesh by proper attention, without being housed, provided they have shelter, and a tolerable dry place to lie on: but in this way there must be a waste of food, and a waste of manure, two great defects; and the strong will not only rob, but will in other respects materially injure the weak. This is a system, upon these accounts, not to be recommended, though sometimes, from necessity, it must be adopted; as, from disappointment in sales, and when stands for beasts are not provided.

Winter feeding.

This is one of the advantages of an improved system of agriculture: to it the regular supply of fine beef during the winter, and first months of spring, is owing, the markets of all the towns being furnished with that article according to their demand. Not a great many years ago, the chief dependance was on the cattle fatted at the several distilleries, which, though not of the same quality

as that now produced, was still preferable to salted meat. Belfast market, at present as plentiful as could be desired, is supplied not only by those gentlemen, who are mentioned as turnip growers in the county of Antrim, but by several in the county of Down, of equal spirit. A considerable number of beasts are also fed every year by farmers, who do not raise turnips, in their place substituting potatoes, which answer well; but, the ground not carrying any weight of the latter equal to the former, the feeding comes much higher, though the quality of the flesh is fully equal.* In feeding, all cattle are tied up in the house, and kept clean and airy, their green and other food being given at stated times, and attentively proportioned to their several appetites. When a sufficient quantity of juicy meat is given, no water is required to make them eat the drier kinds, the more of which they take, the firmer and better coloured their beef will be. To the farmer it certainly is more expensive, but it does him the more credit, and secures his customers, who find a ready sale for the improved quality. An object of great importance in this business, is the putting up the

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cattle

* If an acre produces 400 bushels of potatoes, which is a good crop, that will not weigh above 10 tons. An acre of Swedish turnips will weigh above 40 tons.

cattle in high order ; it is up-hill work to fatten a lean beast in the stall ; when this is attempted, the chance is, that the summer's grass will be required to complete the matter. If hay is scarce, and turnips plenty, cut straw might be used, or a small portion of oats, either threshed, or in sheaf. The most profitable way of using the latter is to get it broke at a mill, just as it comes from the winnowing machine, there being no necessity for taking off the skin. Cabbages are very good for bringing on cattle, but they are more subject to decay than turnips ; and, from the mode of planting, instead of drilling, they are more troublesome and more uncertain. But for both these defects there are remedies ; for the former, not to put the plants in the ground too soon ; for the latter, to drill them ; for, transplantation is not necessary for a cabbage ; if properly managed, it will grow as large in the seed-bed as any where else ; but, if they are sowed where they are to stand, they must be thinned, and this operation will afford plants for some other purpose.

The principal points, attended to in stall-feeding cattle, are cleanliness by constantly removing the dung, and sweeping the pavement, so that no dirt can adhere to them. The places they are fed out of ought often to be attended to, for preventing

venting any bad smell; and very little food must be given at a time, and it must be varied properly. Cattle, that are carelessly fed, never thrive well. The place, where they are kept, should be warm enough to afford them shelter, for they must never be chilled; at the same time they must not be kept so warm, as to promote perspiration in any visible degree. Cattle, that are put up in good order, and in good health; which good condition implies, will seldom, if treated in this manner, fail of answering the owner's expectations in securing a good market; neither will the butcher be disappointed in his profit.

Soiling.

Clover stands high in the rank of productive crops, whether it is considered for its own value, or as a preparation, in regular course, for crops of grain. It is valuable in every light, in which it can be considered, either as pasture, as meadow, or for soiling; in this last method of using it, the advantages arising may be fairly estimated at three times as much as can be obtained from it in the usual way of turning cattle upon it; the trouble certainly is greater, as well as the expense, from the necessary attendance; but the
quantity

quantity of manure, applicable to any required purpose, is more than equal in value to that trouble and expense. Another objection, equally without foundation, has been urged against its use as soil; that cattle do not thrive upon it, when cut, as well as when they are at liberty. Upon this subject I shall give Mr. Young's statement, as published in that valuable work, *The Farmer's Calendar*. "Mr. Mure had 240 oxen fattening in sheds through the summer, and that by the mowing of one scythe. The beasts were all sold fat at Smithfield, and did as well as similar beasts had done, fed abroad in favourable seasons, and better than in any season not remarkably favourable." Mr. Young practised it himself for several years together, very carefully, for fattening cattle; weighing alive periodically, both while in stall, and when at grass, and found that on soiling they thrived better than when abroad. Here then are both objections answered by his great authority; the attendance, when calculated, comes to little, and the thriving is completely ascertained. But, without appealing to such distant authority, I can say, that Mr. Mussenden, at Larchfield, kept his whole stock of young cattle during the summer, in his straw-yard, upon clover carried to them, and they made as great a progress in that way, as they

they usually did on grass at their full liberty. Some heifers were sold fat, from this yard, in the month of August. These beasts were well littered, and their food distributed in several cribs, so as to allow all to feed without much interruption from the stronger over the weaker, which, without this precaution, is a most serious evil to the latter. In the keeping of milch cows, soiling is also a great object; for, let the grass on which they go be of the very best quality, at a particular season, when its shoots harden, it loses much of its succulence, and the cows fall from their milk; but the freshness of the second cutting of clover, which comes in about that time, not being liable to this defect, no falling off is the consequence, but what arises from the natural decrease of milk at a distant time from the period of the calving of the cows. The increased quantity of food, which a given quantity of ground managed in this way will afford, seems to arise, if I may use the expression, from the economical expenditure, and would answer (as I know from experience) even with any grass-field, that arrives to a length sufficient for the scythe. When cattle go at large, they tread down much of their food, bruising it, and making it foul with their feet and with their dung, which for one year at least is of little service; and, when
they

they are to be maintained in this way the whole season, so great a scope must be given to them, that a great portion of the plants run up to seed stems, which may be considered as lost, no pressure of hunger ever forcing the stock to have recourse to them. But, before this system can be completely adopted, a sufficient provision must be made for the cattle so to be maintained, until the green food is of a proper growth, which is seldom the case before the latter end of May, or the beginning of June. For this purpose, if other food is not to be had, a piece of land may be set apart for them, just enough, with a little hay or straw at night, for their support; and, if their entire confinement is thought too rigorous, this may serve as a place of air and exercise for them during the remainder of the season.*

When clover is to be employed in this way, the best preparation of the soil is most certainly implied; it must be sowed with the first crop of grain after the fallow crop, to insure success. In this case

* This is no theoretical recommendation; for, the writer of this has been in the habit of managing his cattle in this method for more than twenty-five years, and, if he has not clover, he substitutes grass. Last summer, 1810, he fattened two young cows, one of 5½ cwt. the other of 4½ cwt.; the former had six stone of tallow, the latter five and a half; the beef of both good and firm.

case, seed and season being good, there is little fear of disappointment. In the fine loams near Belfast, where it is sowed in this succession, the produce is immense; and it is often sold upon the ground, to be retailed in the town. Mr. Legg, of Malone, has sold it so high as £ 20. per acre, and his highly cultivated and dressed demesne* is three miles distant from the market, where it is daily exposed for sale, tied in bundles, which are sold either single, or by the dozen, so reasonable, that after all the expense of buying, cutting, carrying, &c. I am informed that a horse can be kept on it for less than a shilling a day. •

In speaking of the course of crops it has been already mentioned, that in the wheat districts clover is not often sowed with the first crop of grain; consequently its produce is neither so great, nor is it a good preparative for wheat. It is generally used for grazing, and answers well in this mode of management, which, if it stands only one year, gives a certainty of a good succeeding yield in oats; but, if it stands for two years, the ground is deficient both in the quantity of grain,
and

* Mr. Legg's attention extends far beyond his own demesne, and may be perceived from the comforts of the cottages, and neatness of the fences on all sides of his place.

and in cleanliness ; yet some of the wheat lands have been so well prepared, and are of such a good quality, that they will often admit of barley on two ploughings, and a subsequent growth of clover equal to any purpose, either of feeding, or of mowing. If the latter mode is adopted, the horses of the farm generally come in for a large share, and the cows for some of it, especially in the hot days of summer, when it proves a double relief, both as food, and as keeping them sheltered from the scorching rays of the sun, under which every observer must have seen how much is suffered by every species of cattle. To a farmer, who depends on his clover crop for the support of his stock, there must be some supply, when this fails in September, as it generally does. This supply is usually afforded by the stubbles, or the aftergrass of his meadows : the first is but a poor dependence ; the second, the best he can have, if there is a quantity equal to the stock, until the housing time comes ; but, if that is not the case, vetches, sown in May, will be just coming on as the clover fails ; and for milking, or fattening, they are fully equal to clover, though, admitting of but one cutting, they are inferior, I think, in produce ; but this great advantage attends them, they may be sown at many periods, and depended on as a supply, if the clover fails.

SECT.

SECT. 5. *Gardens and Orchards.*

The art of gardening, as an appendage to the establishment of the country gentleman, or to the villa of the opulent merchant, is now well understood, and is carried to a great degree of perfection in this county; all the vegetables, that are either of the first necessity, or that are mere articles of luxury, are to be found in these gardens. Green-houses for rearing those plants, which will not bear our climate without cover, are numerous, and in many instances stoves for ripening the fruits of the tropics.

Among the great body of the people, this most pleasing and profitable pursuit is daily gaining ground. That part of the county, inhabited by the descendants of the English settlers, was always embellished with gardens and orchards; the others, as their circumstances improve and their ideas enlarge, follow their example. The market of Belfast is well supplied with vegetables, either by those who follow gardening as an occupation, or by the surplus of gentlemen's produce.

In the neighbourhood of that town land is rented at a very high rate for that purpose, and the produce exposed to sale by the owners, or re-

tailed by others; for all these articles the consumption of a town, containing nearly twenty-three thousand inhabitants, must make a great demand, and give a great and regular sale for them. The smaller fruits are in great abundance, and are brought, not only from the vicinity, but from distant places. A great variety of gooseberries have found their way from Liverpool, and from other parts of England; these varieties are continually increasing, but it is thought they have, in many instances, gained more in size than in flavour. The gardens of the cottagers are more attended to than they were, and, in many instances, are cultivated not only with profit, but with taste. To a man, who has been confined to a sedentary trade the greater part of the day, an hour spent in the attention requisite to a small spot of ground, must be a most pleasing relaxation, as well as a source of health and a motive to sobriety; for, an evening passed in this way will not only be profitable by what it is the means of producing, but by what it is the means of saving.

Orchards.

Orchards.

The failure in the crops of apples, for many years, was attributed to a change in our climate for the worse; but it rather appears to have proceeded from the natural decay of the species of apples, which, from the number of years they had been propagated in succession, were grown effete. In consequence of the former idea, most of the orchards were rooted up, and none planted in their stead; but, in a few cases, new grounds and new kinds being tried, and having been found to succeed, the planting was recommenced, and success has attended the attempt, where proper preparation was given, and where soil and situation answered.

The soil of this county, particularly in the southern parts, being strong and deep, and, when drained and manured, rich and mellow, is well calculated for the growth of fruit trees; consequently they have been, under right management, a profitable object of cultivation. In the old way of planting, it was usual to raise the ground, on which the trees were to stand; but the mode now is, to keep the ground from being too moist by draining, and to enrich it, both before and after planting,

planting, by setting potatoes in it. The manuring and tillage, given to this root, is the best preparation for the young trees; some persons put a quantity of rich compost immediately about them. Mr. Owens thinks the best thing, that can be put to the roots at the time of planting, is the chaff of grain completely rotted; its richness encourages the growth of the young fibres, whilst its mellowness gives them an easy passage. Mr. Owens being very attentive to fruit trees, and also, from that circumstance, very fortunate in raising them good, his opinion deserves weight; therefore, I shall mention some of his observations. On replanting ground with fruit trees, he finds it necessary to bring new earth; he also stakes his trees, not only to prevent them from being shaken by the wind, but even to give their branches the proper set, and by pruning them to keep the middle open. The produce of the orchards is generally sold on the trees to men, who retail them, or who make them into cyder; of the latter, however, little is made, as the demand for apples is great at home, and there is a considerable exportation of them to Scotland, when that demand is supplied. New varieties of apples are every year making their appearance, to supply the place of those, that are worn out; and the numerous nurseries

series are furnished with them, and with the best kinds of the older fruits, that have not as yet shewn signs of decay. Amongst those, which it now seems impossible to bring to any kind of health and vigour, though they will live and vegetate for a few years, are counted the white and golden russets, and the golden pippin. Amongst the new kinds, the strawberry, peach, and plumb apples are much esteemed for their beauty and flavour, and the honey-ball likewise; these are summer apples. Of the keeping kinds, the Kerry and Ribston pippins, the red tankard, and Ross nonpareil are reckoned very nice; but the crofton apple, when pulled in proper time and well kept, preserves its freshness and flavour longer than any other. There is an apple now very much cultivated, not only from its being a good bearer of large and well flavoured fruit, but from the circumstance of its growing from cuttings, and from its having fruit the second or third year; it is known by a variety of names, but it is commonly called the Saul apple, having first made its appearance in the parish of that denomination near Downpatrick. In taking cuttings of this apple, it is necessary to observe those branches, which have rings and small knobs around them, that rise a little above the general surface, somewhat like

like a knot, and these are the most certain growers; large pieces will also take root, and they bear sooner than the smaller ones. This apple, from the quality it possesses of growing with such facility, and from the size and beauty of its fruit, and the goodness of its taste for several months, is a great acquisition to our gardens, where it grows well on espaliers; and to our orchards, where, when it is grafted, it grows well as a large standard. The best situations for orchards are those, which have shelter from the north and west, the exposure to the south-east, that the first rays of the sun may not strike upon them in case of frosts; for those plants are often injured by late frosts in spring, that are open to the morning sun, whilst others equally tender escape, - to which it has not access for some hours after.

The pear tree possesses a greater degree of longevity than the apple in this country, and grows to a much larger size. The celebrated Portmore pear was most probably planted in the garden there, at the time the stables were built by Lord Conway, in 1664; they were wall trees at first, and still retain the shape at their basis, one of which I measured was nine feet in circumference, with great branches spreading parallel to the wall, the height, I am certain, from forty to fifty feet.

These

These trees, when I last saw them in the autumn of 1810, were healthy, clean in the bark, and full of fruit. The pear is yellow, with a reddish tinge on one side, before it is quite ripe; this it loses, and afterwards becomes mellow. It is known as the Portmore pear, and in the early part of the season is good. I could mention many other instances of the size and longevity of the pear tree, but shall only point out one more, that tree, which stands near the entrance of Mr. Thomson's on the Belfast side of the place, where the turnpike stood on the Carrickfergus road.

I have not heard of any varieties of the pear having been produced here, those, which are cultivated, being got from the nursery men, who have procured them from England, or from gentlemen, who have brought them from thence. What the profits of orchards are it is not easy to ascertain, but they must be good from their increasing in number every year; and, if the trees are not planted too close, the grass will always pay well for soiling at least, to which purpose it is better adapted than to hay, both from its succulence and from the difficulty of making it among the trees. Apples are, when sold in large quantities by the buyers of orchards or by the owners, measured by the bushel; when in smaller quantities, they are sold by number,

number, so much per hundred, according to their size or quality. They are retailed in all the markets as long as they will keep. By the bushel apples are sold at various prices, according to the kinds and the time of year; at first gathering in 1810, they were sold at the orchards from three to five shillings; but the best kinds somewhat later are often sold at from seven to ten shillings; the crofton, nonpareil, and pearmain bear the highest prices, as they are the best keeping apples.

SECT. 6. *Woods and Plantations.*

In the county of Antrim there is not much natural wood now existing. It is many years since the great woods at Portmore have been cut; those in the great and little parks of Glenarm have been more recently disposed of, and very few trees are now left about Crebilly; but Shane's Castle has still the advantage of being clothed with its native woods. Besides this there are some unplanted trees in existence, on the steep banks of a few rivers; Crumlin river at Clendaragh shews, how advantageous as well as beautiful it would be, if more ground like it was devoted to the same purpose.

There is also a little portion of small wood still left on the mountain between the Garron point
and

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and Glaparr. About Nappar, this grows out of the perpendicular face of the rocks, and, though not very valuable as an object of purchase or of sale, is highly so to the traveller, who in journeying southward must be pleased with the contrast it forms to the wild scenes he has just passed.

Of the trees, which this county produces, or which have been introduced, the oak claims the first place; the magnitude, to which it has grown, and which it preserves where it has been allowed to remain, shews that this is a soil congenial to it, especially round Lough Neagh; the oaks at Shane's Castle are numerous and remarkably fine; in every other place also, where they have attained a proper age, the same may be said of them; the measurement of the great tree at Portmore, though rather imperfect, will ascertain the fact, and shew, that it is only age they require to obtain such a size as would render them fit for the most valuable purpose—the use of the imperial navy.

ft.

Length of stem to the first branch - 25

Circumference fourteen yards or - 42

One branch made an axletree for a bleach-mill, and sold for 9*l*.—timber at 1*s*. 6*d*. per foot; the timber of the stem at the same rate sold for 97*l*.;

the remainder built a lighter of forty tons, and sold for 30%. The bark having been mixed with that of other trees, the produce is not known.

The Cauthorpe oak at Witherby only measured 16 yards at 3 feet from the surface. Its height certainly was greater, and the principal limb measured 16 yards in length.

Around this great tree at Portmore were many trees, that in any other situation would have been accounted very fine. About fifty years ago, having lost some of its principal roots, it was blown down. The timber was good, and the grain fine; I have seen many things made of it. From the dimensions of this tree, and of many others which grow in similar situations, it may be seen of how much consequence it is to adapt trees to the soil; that of the district just mentioned being deep and moist, with an understratum of clay, is peculiarly fitted to the production of oak; nor is it less fit for the growth of alder, which here arrives at a very respectable magnitude, and being one of the native species, the timber is very valuable, and, when worked up for furniture, very beautiful: for all farming purposes it is as good as ash, and in one particular more to be prized, as it lasts much longer. The value of this wood is only now be-
ginning

ginning to be known; but, as the finer foreign kinds grow more scarce, we must have recourse to our own.

The birch, in the same soil, grows well and attains to a considerable size; either single, or mixed with other trees, it is very ornamental; some of that species, with pendant branches, are amongst the most picturesque objects our woods afford.

The ash is more generally planted than any other of our native trees; its uses being so extensive, and the idea, that no other wood can supply its place to the farmer, operate in this effect. It grows in most soils and situations; in dry grounds, though it does not get on so rapidly as in the moist, the quality is much superior, and of this difference the farmers, who use it for so many purposes, are fully aware. The mountain ash is seldom planted except for ornament; in its natural state it attains a good size; the timber is light, though strong, but it is not much employed for general use.

The hazel is only found, where nature has planted it; those, who wish for the fruit of the nut tree, set the larger kinds, which, from the improved modes of gardening, come much sooner into bearing. The wood is useful for many purposes, such as making hoops, &c.

The

The holly grows in the natural woods, and both the plain and variegated kinds are much admired as shrubby plants. For hedges it is excellent, though slow in growth at first. Whoever has seen the noble hedges formed of it at Red Hall, and at Clover Hill, in Mr. Moore's garden, must be sensible of its great advantages, both as a fence, and as a shelter.

The white-thorn has been so often mentioned, in speaking of fences, that little need be said of it here; and the occupiers of land in most parts of this county seem to be fully sensible of its value. When single, it grows to a respectable size, and is one of our finest objects in a lawn.

Among our native plants the crab-tree (*malus*) may be reckoned; it grows spontaneously in the neighbourhood of Lough Neagh, along the whole extent of the coast from Portmore to Toome, in some parts, to be a very large tree. Many persons must remember those at Portmore, one of which, in particular, rivalled an oak in its height, and in the spreading of its branches. When this noble plant was covered with blossoms, its appearance was magnificent. In the same tract this is much used, when young, as a substitute for quicks. The hedges formed of it are strong, but irregular in their growth; they are, nevertheless, a good fence, and

and, when grown to a large size, give the country a wooded face. In the demesne at Shane's Castle I observed many of them, single, and very fine. The timber resembles that of the apple tree, but I have never seen the latter either so large or so straight in the stem.

To this enumeration of native woods the grey sallow may be added: in some situations it has arrived at tolerable height and thickness; but, being generally exposed to the depredations of cattle, it has not justice done to it. The wood is tough and light, and, when of sufficient dimensions to be employed in agricultural purposes, it turns out well; as it is our own produce, it might, by studying its nature and habits, be useful, where more delicate trees will not grow. I cannot, with any degree of certainty, say whether the elder is the natural produce of the soil or not; though it does not come to any great size, nor is it much admired where other trees will freely grow, it is a great acquisition in exposed situations. Near Ballintoy, at the Rev. Robert Trail's, it is the only tree, that completely resists the blasts from the northern ocean, growing there as freely, and as unrestrained as in other places; on this coast, where the shoots from every other tree are cut off in the winter following their being put forth, one feels quite

quite grateful to the elder for the shelter and protection it affords.

Many trees, that are not indigenous, are now so perfectly naturalized to our climate, that they grow as freely, and ripen their seeds as well as if they were the produce of the soil; others grow to an equal magnitude with those, that are natives, but seldom can be continued from their own seed.

Of this the chestnut and the walnut are instances.

The walnut, which seldom ripens its fruit here, is one of the largest and most spreading trees we have; those, which grew in the village of Lambeg, were, thirty years ago, admired by every traveller of the northern road; they must, from their appearance, and from other circumstances, have been planted some time in the seventeenth century; the soil, in which they attained this growth, is a gravelly loam, with an understratum of reddish clay, and sandstone under it. I am sorry not to have it in my power to give the dimensions of the largest, which grew on the road; it was one of the finest of trees, and the quantity of valuable timber it contained was very considerable. On the south side of Lisburn are still some of this species, in a similar sort of respectable height and thickness, but none to equal it. The timber of this,
in

in quality and variety of grain, is not much inferior to the best mahogany.

The chestnuts at Orange-grove, Mr. Templeton's place, in Malone, are very great trees; they most probably were planted about the same time as the walnut, but there is no record respecting them: the dimensions of the best are as follow: No. 1, twelve feet in circumference at about four feet high, March, 1811; at the same period, 1807, it measured only eleven feet, ten inches—increase in four years, two inches. No. 2, six feet, ten inches; in 1807, six feet, eight inches—increase, two inches. No. 3. nine feet, eleven inches; in 1807, nine feet six and a half inches.—increase, four and a half inches. The soil, in which these chestnuts grow, is a fine sandy loam upon reddish clay. There is an appearance of fruit on the trees of this species, which grow here, but it does not fill. The timber very much resembles oak, but there is more variety in the grain.

The elm. This much admired and valuable tree is very general in the best parts of the county. That kind, which has produced the greatest trees, is the small-leaved English elm. Among the many specimens of this tree, which we have, those two, which grow in the castle garden at Lisburn, are very conspicuous, being seen towering above the town from every approach.

They

They stand on a terrace, where the soil has been embanked, and supported by a wall. These trees are in circumference nearly equal, being about eleven feet, six inches, and carry their thickness to near twenty feet.

At Shane's Castle the elm seems of the same sort, and has attained an equal size; at Castle Upton, also, they are very fine. In all these places the soil is rich and deep. As the elm is liable to be blown down, from its rooting so near the surface, the grafting them on the stock of the Scotch elm seems to be an improvement, as it remedies that defect. The latter tree is a very free grower, but the timber is not equal to the former, which is very useful for many articles of furniture, &c. besides having the quality of lasting long under ground. Some varieties of this tree have been introduced, one in particular, with the centre of the leaf of a lightish green, inclining to white. This is a pretty plant, when it comes out first in spring, but it loses, after some time, the contrast of the two colours.

The lime tree is not much valued for its timber, but greatly for its beauty; nevertheless, I have been informed of late, that the wood of it is excellent for most purposes of inside work; the

the colour of the boards is clear, and the surface is smooth; it is reckoned the best wood for carvers; but it requires age for all uses of this kind. The charcoal made of the lime tree is accounted the best for the manufacture of gun-powder, being the most inflammable; that produced from oak, and from beech, the best for fusing metals. In the lawn at Castle Upton are fine lime trees; the soil deep and good.

This county has produced the beech in great perfection; it must be in the recollection of many, what noble trees of this kind grew about Antrim, and in the old Castle garden at Belfast, which is now covered with buildings. At Castle Upton, I observed this tree in great health and vigour. It is a tree so generally known, that no more need be said respecting it, except that the soils of these places specified are all of the best quality, as likewise the place where it grows to the water's edge on the Carrickfergus road.

The sycamore deserves double attention; first, for the value of its wood, and, secondly, from its growing in exposed situations, where they are even so much so as to cut off the shoots of the preceding year; still they persevere in throwing out fresh ones, giving in summer a clothed appear-

ance to the ground; on the northern coast this constantly occurs, if the plantation is within reach of the spray driven in by the north-westerly winds; when they are out of its influence, they will make a better progress than most of the other kinds. Of the Scotch fir I need not say more, than to observe that its growth is proportionate to the favourableness of its situation. The silver fir grows to a large size in the deep and moist soils of Antrim: Close to the shore, in Lord Masserene's park, are some very fine stems of this fir, as well as at Castle Upton, and other places. It affords good and clean plank or boards, rather whiter and closer than the Scotch fir; but of its duration I cannot speak, from want of knowledge.

To the spruce fir, which in its youth is so very ornamental, something of utility might be sacrificed, if necessity required; but, from the observations I have made,* I find it in growth nearly equal to any of the species of fir, and I have reason now to think, that the timber is not inferior; though it is knotty, it works well, and seems to be as lasting as any fir of our own producing, the larch excepted. Our own firs are
often

* See Survey of the County of Down, for measurement of trees of same age, in like soils—page 164.

often as large as any imported, but they are not esteemed of such durability. From whence does that defect proceed? It is a question worth resolving. To do so I must confess my own incompetency; nor do I recollect to have heard any good reason assigned for it, nor any remedy pointed out.

Larch. Though the larch is so well known, and, from its qualities, is so much esteemed, yet, while so much ground remains in a comparatively unproductive state, that by means of it might be rendered highly profitable to individuals, and to the public, no opportunity of inculcating its great utility should be passed by. There are few among the numerous and respectable properties, which this county contains, that do not possess portions of ground (that at present yield little, and that in the usual mode of improving will never yield much) which might be beneficially employed in this way, without in the least encroaching upon that, which is improveable.

The steep and deep glens between the various mountains and hills, the many grounds which are nearly paved with stones and rocks, but between every one of which earth sufficient for planting small trees might be found, when planted would soon become productive; and, the larch, being useful

ful at so very early a period, the necessary thinnings would make a return, that at no distant time would more than pay the first expense; and in every succeeding thinning the profit would increase. Sir Cecil Wray, in Lincolnshire, upon the wastes of his demesne, planted larch on a tract, that produced only £40 per annum, which now yields £500 from the regular fall of larch, which were planted by the baronet himself; and in Sussex it is planted instead of Scotch fir, which it exceeds as well in growth, as in the goodness of its timber.

That it will also grow well in sand, is proved by the healthy situation of the plantation on the banks at Shannon Castle, and the steep banks near Red Hall, that are covered so judiciously by Mr. Kerr, and shew that it will do in situations unadapted to any other produce; and in situations favourable, the following measurements will shew how beneficial they are. Of two larches planted by Mr. Templeton, of Orange Grove, in 1796, one measured 3 feet 8½ inches, and another 3 feet 10½ inches in March 1811, and would square 16½ inches.

There are many different kinds of the willow tribe now introduced, all of them in moist grounds, very quick growers, and some that are so even in dry soils. But they are not so generally cultivated as they

they ought to be, from their general utility ; for they are applicable to numerous uses upon a farm, and the lightness of the wood is the cause that all instruments made of it are easily handled, and at the same time, from their toughness, they are not liable to be broken ; and, the bark containing so much of the principle of tanning, the planting of this species ought to be extended upon this account, as well as for other excellencies.

Oziers, for baskets and for hoops, are much grown, and very considerable profit is derived from them. They are generally cut once in three years, but some cut them twice in four years ; that is, the first cutting is three years growth, and the second, one year's ; after this, they are dressed up, and the deficiencies made good. Opinions are different respecting these modes of management ; experience alone can decide which is right.

Those, which are allowed to stand for three years, are sold to coopers, either as they stand, or prepared for use, but, generally, as they stand. Those of one year's growth are bought by basket-makers, who peel them before they are allowed to dry, and then take them to their manufactories. The tops are used for fastening the materials on thatched houses. They are exposed for sale in the markets, where they meet with purchasers.

These

These various uses, to which the willow tribe is applicable, and its rapid growth, must therefore make it a most profitable species for the farmer to plant; for, besides those mentioned, it is adapted to many others. The extensive cultivation of it in England ought to be a lesson to us; for, though the same necessity, from want of wood, is not felt there as it is in Ireland, yet it is to be seen in every county. To its other good qualities may be added, that of burning well whilst green. It is in the low grounds near Lough Neagh where it is most generally raised, every farm having some spot, or the ditches planted with it. But there are few land-holders of any description, who might not find room for it in some part of their grounds, where it will thrive.

In speaking of those trees, which appear to me as the most generally useful, I have been very particular in stating the soils, in which they have grown to any considerable magnitude, as a guide to those, who may meditate planting; that each kind may be committed to that, which best suits it. An incipient planter is often inclined, is often prejudiced in favour of one species, from his idea of superior beauty or utility; but, if the soil is unadapted to it, he will neither have the one nor the other advantage; for an unhealthy
tree

tree can neither be handsome nor useful, whereas a healthy tree, whatever be its kind, must be both. In planting, it is much the custom to mix a variety of kinds, from the idea of ornament; this may be done on a small scale; but, where large plantations are made, portions ought to be set apart for each sort; for the same soil does not agree with all. Some are quick growers, and will smother the slower: some trees have long and straggling branches, which injure their neighbours of a more upright growth; and add to all these considerations, that, when the body of wood is meant to be great, the variety of tints, which arise from the different kinds of trees, destroys the effect as to the greatness, which one mass of uniform colour never fails to produce.

Though I have mentioned the cutting of the woods in some parts of this county, yet that loss is more than supplied by the general spirit of planting, which the gentlemen possess: there are a number of them resident, and few that are not improvers. The farmers also, in certain parts, contribute their share, and, though there are many and extensive naked tracts, there are others, that are sufficiently clothed with trees. A great part of Masserene has already been spoken of, as well as the southern part of Antrim and Toome, which
also

also about Moneyglass and Drumreman has a very wooded face.

The vallies of the Six-mile water, and the Braid, offer many views enriched with planting. The whole extent, from Lisburn to Carrickfergus, has been enriched with plantations, and about Castle Dobbs and Bally-hill there is a noble mass. At Red Hall are many old trees, and considerable plantations of young ones, and at Kilwaker the same. At Leslie-hill, the plantations are very extensive; and about the castle at Glenarm are many very fine trees, and many of rare kinds. Upon the whole, the county of Antrim, in this useful as well as ornamental improvement, is making as rapid strides as any other county.— But Lord Macartney's plantations at Lissanour must be particularly noticed, not only on account of their extent, (about seventy acres) but from their situation, which makes them particular objects of attention, in a country abounding with bogs. A considerable portion of bog lies about the mansion; through these canals have been cut to the soil underneath; and on this soil, when spread, trees of a great variety of kinds have been planted, which have grown with great vigour. That trees have grown in bog, is evident to those who have tried the experiment; but in the pure boggy soil

soil they do not make so great a progress, as in other grounds; therefore, though it might not be convenient, nor indeed necessary, to make such large cuts as his Lordship did, yet it is a good lesson to planters so circumstanced; and the requisite draining and inclosing will thus furnish the materials for a speedy and successful progress. The effect of these extensive plantations on the appearance of the country is truly interesting, the contrast being as great as possible from the wild and uncultivated state of the neighbouring mountains and bogs. Upon the whole, though a great deal remains to be done in the county of Antrim, a great deal has been done; and the hope is, that the spirit of improvement, which seems to be daily increasing in all ranks, will in time change the appearance of every dreary bog and uncultivated hill, which can admit of such amelioration, into smiling fields, or into rising groves.

SECT. 7. *Mountains and Bogs.*

As the mountains of Antrim occupy so considerable a portion of its surface, it is worthy of inquiry how far they are capable of improvement. Though their elevation is not great, yet they are in many

parts far above that point, at which grain can be cultivated with a prospect of success. The highest is only 1586 feet above the level of the sea; but many tracts of them approach to that altitude, which precludes, even in the less moist climate of England, the ripening of the corn crops; * for it is observed there, that in the latitude of 55 degrees, when grain is sown at an elevation of 600 feet, the crop becomes uncertain; and that this is the greatest height, at which wheat will grow with any prospect of advantage. Even at this the grain will prove light, and will be a month later in ripening than that, which is sown at the foot of the hills. Between six and eight hundred feet may be reckoned the greatest elevation, at which any other grain will ripen; and still the same objections of crudeness, and uncertainty as to the time of maturation, remain; for the natural dampness of the soil, the fogs which settle upon them, and the absence of the sun, the consequence of these fogs, at a very early period of the autumn season, destroy the texture of the stems, and render them unfit for the supply of the necessary nourishment to the ear. A crop, therefore, of very light grain and straw of an inferior quality, nay even some-
times

* Report of North Riding of Yorkshire.

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times of straw alone, is the utmost, that can be expected from sowing of grain above a certain height.*

Leaving, therefore, these more elevated tracts in possession of that hardy race of native cattle and of sheep, which find a summer subsistence on them, we shall descend to those comparatively lower ranges, which are in most parts, to their summits, covered with a good, though light loam, and in their natural state clothed with herbage. In the section on feeding it was said, that these grounds are mostly appropriated to the grazing of cattle; but parts of them have been brought into culture, and are susceptible of improvement, the first essay to which is a crop of potatoes set with the spade; and to this mode we are indebted for the progressive melioration, which is daily taking place, and which, on the high grounds to the west of the road from Lisburn to Carriekfergus, is gradually creeping to their summits, as far as their steepness and climate will allow: and certainly,

* Many years ago, a gentleman built a house, and began an improvement on the mountain above Cushindall: there I saw, in the latter end of November, a most luxuriant growth of oats just come into ear, and as green as they usually are in happier climates in the month of August.

tainly, of the different modes adopted in the bringing in of soils hitherto uncultivated, the spade potatoe culture is the most encouraging, which, in the course of a few months, not only gives a return in food, but leaves the land in a state of producing more. To this root many parts of these green mountains, as they are stiled, are much better adapted, than to the raising of grain, from the causes just assigned, as operating against this cultivation, on the more mountainous parts,

To the potatoe, therefore, as the first object they ought to be devoted; if grain will ever prosper on them, it must be under the auspices of that vegetable; if it does not, still it ought to be resorted to as a preparation for grass, as well as for its own intrinsic value; and, though the grain which follows may be light, yet the straw being necessary for manure, and for the maintenance of cattle, (the riches of a mountainous district) a crop of grain, such as the land is able to produce, must always follow. With this grass-seeds ought certainly to be sown, or florin planted, the ground being previously levelled, so as to admit of being watered, which their declivities generally admit of in a high degree; the portion thus gained,
and

and brought to profit, may then be nearly left to itself, except the attention required in applying the necessary irrigation, and another division may be attacked and carried in the same manner. Besides potatoes, many other plants will thrive in high situations, turnips, and all the cabbage tribe; and, as moory or mossy soils generally abound on these heights, or in the hollows between them, their ashes are another source of manure, and consequently of improvement, which by bringing in these auxiliary vegetables may be prolonged more, than if potatoes alone are attended to. But I must repeat that, where the produce of grain is uncertain, and that of any other crop certain, the former must and ought to be subservient to the latter. The raising of grass, therefore, seems to me the ultimate object in the reclaiming of mountainous grounds; their moisture makes them peculiarly fitting for it; and they enjoy in most cases the capability of being irrigated at a much less expense than any other land. In the north of England, and in Scotland, irrigation has been tried with such success upon mountainous tracts, as to have converted in a short space of time heathy pastures into verdant meadows; therefore, in this country, where the propensity to grass is as great, if not greater than either in England or Scotland,

Scotland, the application of whatsoever substance tends to encourage that propensity must therefore be proportionally useful. The facility, with which this improving operation may be accomplished in situations such as we have been speaking of, must be apparent to every person, whose attention has been directed to rural objects; it must immediately be perceived, that to direct the water by dams made across the beds of the streams, and to throw as much of it as can be done, and as equally as possible over the surface, so far as it will reach with advantage, is the principal point to be obtained; and that to do this there is neither much difficulty nor expense. The subsequent management is so well known, that it is scarcely necessary to say, that the regularity of the inclined plane must be such, that the water cannot stagnate on any part, but must be kept in constant motion, and that motion not rapid, but as gentle as can be accomplished according to the inclination of the ground.

In the construction of the dams, the great difficulty is, to preserve them from the effects of floods; places, therefore, ought to be chosen, like those for watering flax, where the natural situation of the ground is favourable to the necessary resistance required at the times of their prevalence.

valence. The dam being once formed, the water may with great facility be distributed on either or both sides, by small cuts, having just fall sufficient to make the water flow with gentleness and precision over the whole of the surface, which must in some degree be prepared for it.

But, as improvers are apt at first to run into great expense, and then to be disgusted, if every thing does not answer their most sanguine expectations, the first experiment might be made on a small scale, and time given to shew how it will answer (of which there can be no doubt); then the inequalities of the surface may be filled, and the ground made fit for mowing without further trouble; the levelling of the surface is required to prevent the stagnation of water, the cause of growth to the coarse and sour aquatics, and of destruction to the finer grasses. It is under such management as this that the florin would flourish; and, as it forms a firm and close sod, it would sooner than any other grass come to be profitable, and be less injured by the tread of cattle. I shall not here detain the reader by detailing the modes of irrigation, or of preparing grounds for irrigation; these he may see in various publications; but I cannot pass over some of those situations unnoticed, where it might be more beneficially employed,

employed, namely, along that whole range of mountains (on both sides) already mentioned as extending from near Lisburn to Carrickfergus, which offer the most inviting opportunities of putting this operation in practice; on the east side of which it would be particularly favourable, as the waters in that direction must be strongly impregnated with the calcareous strata, through which they flow; which substance, in whatsoever state it is administered, is known to be favourable to all kinds of earth, that are impregnated with any principle of acidity, as mountains and other high grounds usually are; for the same reason lime is strongly recommended, as well as the refuse of the limestone quarries, and any calcareous substance, that is to be obtained in the neighbourhood of the limestone country. But, previous to every other improvement, draining must be put in practice; for, even in those parts where irrigation is to be performed, it is necessary as a means of destroying that principle in land, which tends to the production of such plants, as are not only in themselves bad, but which usurp the place of those, that are useful. On this subject much more might be said, and too much could scarcely be said, if it would have the effect of inciting the holders of these or similar lands to accomplish

accomplish what nature does in some degree every day before their eyes; for, there is not any of these high grounds, that does not in one part or other offer to view some verdant spot, where the water, flowing with some degree of regularity, has of itself effected the improvement, which it is the wish of the writer (from what he has observed and heard from the best authority) strongly to recommend.*

Bogs.

The extensive tracts of this denomination of soil, which occupy the surface of the county of Antrim, as objects of improvement claim their share of attention; and it is worth observing, that most of the improvements, which have been effected in them, have been done by the same means as the mountains have been reclaimed, namely, by the spade culture of potatoes; and in a treatise, some time ago published in Scotland on the reclaiming of mosses, it is stated that, though previous preparation was given, still the finishing was accomplished by the culture of the potatoe. It is on the western

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side

* Mr. Templeton mentioned to me his having seen irrigation successfully carried into execution, either on or near the mountain of Slernish.

side of the county, north of Lough Neagh, that the bogs most susceptible of improvement are to be found; for there they do not lie so high as to be injured by the influence of climate, which renders those on the mountains totally unfit for culture. Some of the most improveable parts are those, which lie between Aghoghill and Rasharkin; about the village of Deryock; and one between Rasharkin and Ballymoney, and a very extensive expanse of the same about Slemish. That these might be improved without encroaching on the future provision of fuel is plain, because it is the surface alone that is concerned, and the necessary draining would tend to consolidate the mass, though probably it might prevent its further growth. But, as successful example is the best mode of encouragement to those, who wish to undertake operations of this nature, I shall give an account of the late Mr. Lesly's practice at Lesly's hill, which I saw many years ago. In a very deep bog at no great distance from his house he began by cutting a drain about five feet deep, and as wide again at the top as at the bottom; for, unless this precaution is taken, the sides get very soon too close; the bog was afterwards levelled, and the part appropriated to potatoes well dunged and then planted; the crop was good. After digging them
out

out the whole surface was laid smooth, and sowed with grass-seeds; another portion was marled; the quantity of marle laid on was great, and grass-seed also was sown, without any other preparation than digging in the marle. The produce of this was not equal in any degree to that of the potatoe part, nor could it be expected; for, the setting, moulding, digging out, and the subsequent leveling gave an advantage to the former, that no quantity of marle could compensate for without equal culture; besides, it is known that dung, whilst it lasts, operates on bog with more effect than any other manure. In addition to these experiments, Mr. Lesly improved other bogs by draining, liming on the surface, and by repeated ploughings; on one of those, which I saw in the month of August, (the year I do not exactly recollect) there was growing a luxuriant crop of wheat nearly ready to cut, and to appearance free from any of those disorders, which wheat is subject to; this crop had been put into the ground in the trenching way, that is, sowing the wheat in the ridges, and covering it with spade and shovel from the furrows. At the same period I saw another bog in a course of preparation, by burning the surface and spreading the ashes hot. But the general result of all his trials was, a preference given to the method
 necessary

necessary for planting potatoes; that is, spreading the manure of whatsoever species on the ridge, and covering it from the intervening trenches. In all intended experiments on bogs, draining is first implied; without this nothing need be undertaken, and there are few bogs that in the period of a year, from their being drained, will not be sufficiently firm to bear the weight of horses. At the same time it is necessary to observe, that this kind of soil must not be kept too dry, which may be the case, if the level of the water in the drains is more than two feet from the surface of the ground. In the Scotch method referred to before, the bog is laid out in beds of such breadth as it is deemed expedient; then two furrows are dug, one on each side of the centre of the bed, throwing what is taken out of them on the middle, like the gathering of a ridge in ploughing; the trench thus made is filled with what comes out of another parallel to it, until the whole is turned. In this state it is allowed to remain for the winter, during which, especially if it is frosty, the stuff thus exposed is much reduced and meliorated; after that it is levelled, manured, and managed according to circumstances; but the most effectual mode seems to be by setting it with potatoes on dung. If the intention of the owner

is

is to produce grass, the seeds ought to be sown as soon as the soil is in a situation sufficiently reduced to receive them; for a great deal of the future benefit arises not only from the richness communicated by the necessary manure, but by the division of the soil, by exposure and culture.

In the improvement of bogs, that have been cut over for the purpose of making turf, there is, provided they have been properly levelled, less labour, and more certainty of success; as they are so much sunk by the process, that in bringing them into culture the earth, upon which they have been formed, can be brought up by the spade, so as to be mixed with the peaty soil that remains; when this is of a good kind, and well incorporated in the operation of trenching in and of moulding the potatoes, the improver cannot meet with a more grateful soil than that, which is the result of this compound. All farmers, who live on the confines of bogs, are well acquainted with the advantages attending it, and many of the best meadows this country possesses have had their origin from bogs, that have been cut over nearly to the under-stratum; I must repeat the word, nearly; for, when that substance is entirely taken away, the improvement is neither so easy nor so certain; if sand is underneath, it is deprived of one of its

best

best auxiliaries by taking the bog clean away, and, if it is clay, of one of its best correctives; but, if rock is underneath, the destruction is complete. In this miserable situation many hundreds of acres are to be seen in all parts of the county; some attention is therefore most certainly necessary to prevent this abuse by the temporary occupiers of the bogs, who in making their turf ought to be restricted in this desolating process. Many of these worn-out bogs have, in the resetting of the lands around them, been leased along with them; in this case they have been improved, but much remains to be done still in this way.

Among the many uses, to which bog may be appropriated, Lord M'Cartney's successful plantations shew, that it is favourable to the growth of trees, under proper management; and, though the expense attending his mode must have been great, yet, where bogs encroach upon the demesne, or obtrude upon the residence of any gentleman, the same expedient of sinking to the subsoil, to ensure their growth, ought to be resorted to; for, though it is found that many kinds will grow in the soil spoken of at present, few will take with the same readiness as in those of a different nature, and others will not survive more than one or two years; and, before an attempt
at

at planting in them is made, they ought to be cultivated as well as drained; for, it is found that they are much more likely to answer the planter's expectation, when the grass grows freely, than before that time. The trees, which I have found to grow most readily in pure bog, are the silver, spruce, and Scotch firs; the alder, birch, and white poplar (abele;) the different kinds of willow will do, provided there is an under-stratum of clay near the surface; the larch not so certain as the other firs, except at a very early age. Oak, where I have tried it, makes no progress; elm and lime, or beech will not grow; several kinds of shrubs will thrive, especially the laurel, provided that, on the first planting, some fine mould is applied to the roots. But the white thorn will not do well in bog; if it is wished to form fences of this plant in such places, a sufficient quantity of earth must be brought, in which they can grow independent of this soil; and, if the ground is pressed about them by the weight of stones laid on, so much more chance there is of their succeeding. As part of a compound, however, in which to place delicate trees and shrubs, to encourage them in first striking root, nothing can be superior. Lord Clanbrassil, who was one of the greatest as well as one of the most experienced planters
and

and gardeners of this or any other country, used it most freely both abroad and in the green-house, and found it to agree, when properly proportioned, with all plants foreign and domestic.

On the use of turf-bog, as a manure, a good deal has been said in the portion of this book dedicated to that subject; but a few words more on a material so plentifully produced in most parts of this county, and which may be so beneficially applied, will not, I hope, be deemed superfluous.* About one-third of dung, with two-thirds of friable peaty earth, has been found to produce one of the best composts, mixed together alternately, the mossy soil being put next the ground, and the ends of the whole covered up with the latter; this compost will, after being made carefully up, get into a general heat, according to the season, sooner in summer. In this state it is to remain until near the time of using it, when it is to be turned over; the whole then appears one black mass, which spreads like garden mould and, used weight for weight, will be found in the course of cropping fully equal to farm-yard manure.

I shall now give an account of the particulars of the reclaiming of 837 acres, three roods, and twenty-nine

* This is the Scotch method, which I have abridged: it has been tried and has succeeded here.

nine perches of cut out turf bog in the barony of Masserene, on various parts of the estate of the Marquis of Hertford; the undertaking was commenced in May of the year 1806, and has been continued by his lordship to November 1810. It holds out a most useful lesson to those, who possess lands similarly circumstanced.

<i>Denominations.</i>	<i>Contents.</i>			<i>Expense.</i>			<i>Observations.</i>
	<i>A.</i>	<i>R.</i>	<i>P.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>	
Walsh's bog,	70	0	0	234	14	10	Much improved.
Stoneyford bog	80	0	0	316	17	4	A river was opened two miles and a half, 17 feet wide by 7 feet deep; this was the chief object at Stoneyford.
Kilutra bog,	10	0	0	30	18	10	Reclaimed.
Lambeg bog measured,	138	2	27	352	2	9	In this were ploughed 36 acres of lea, and 1000 perches of French stones laid.
Moyover bog, do.	10	0	0	40	0	10	Reclaimed.
Campbell's bog	14	0	0	30	17	8½	Improved.
Lisnatrunk bog	10	0	0	31	5	1½	Reclaimed.
Ballymacash bog	7	0	0	7	12	0	Ditto.
Boiling-well bog, near Lieburn	8	0	0	13	4	10	Ditto.
Proctor's bog	16	0	0	20	7	5	Improved.
Cole's bog	8	0	0	17	10	5	Ditto.
Annet's bog, Stoneyford	15	1	6	36	16	8	Reclaimed.
Whiteside's bog, Stoneyford	13	3	0	46	18	10	Ditto.
Ballinderry bog	138	2	27	380	1	5½	Ditto.
Dallas bog	47	1	2	143	10	8	Ditto.
Montough bog	155	0	3	458	5	1½	Ditto. ——— The draining of Lough Money is included in this return; it contains 65 acres, and is partly laid down with grass-seeds and florin.
Galley's-gate bog, Portmore	91	1	4	382	6	2	Twenty acres of this are laid down with Doctor Richardson's favourite florin.
Nov. 1, 1801.							
Total acres	837	3	29	2546	11	0½	Total expense.
What is let of the above brings in, clear of former claims,				340	4	10	per annum,
Remain to be let	291	0	0				

This is as near as I can go to what has been done since my commencement.

(Signed)

Denis Kennedy.

The above very satisfactory account was furnished to me by Mr. Kennedy, who was employed to execute the work, which has been performed in a very able manner. It appears from it, that the total expense has been 254*l.* 11*s.* 0 $\frac{1}{2}$ *d.* land reclaimed, 137 acres, 3 roods, 29 perches, two-thirds only of which produce 340*l.* 4*s.* 10*d.* per annum—more than 12 per cent. When the other third is also set, it will at the same rate produce 18*l.* per cent—a most noble return indeed; besides the pleasure of laying out a large sum amongst industrious people, giving so much productive land to the community, and contributing in a high degree to the beautifying the face of the country.

SECT. 3. *Draining.*

This important operation necessarily precedes all improvements in lands, that are superabundant in moisture; without it, manure or tillage are equally inefficient; the former is completely lost, and the latter can never be adequately performed, either as to the method, or the time of doing it. All improvers, whether gentlemen or farmers, seem now fully aware of the necessity of having
recourse


recourse to covered drains; accordingly a great deal has been done, and, as fresh portions of land are appropriated to tillage, continues to be done. If the improver can get so far before-hand in his works, as to undertake his draining process whilst his ground is in grass, one part of the business is more easily accomplished, the conveying the stones for filling the drains; and, if stones are not to be got, the sods necessary for laying above the course of the water, on the projections left for that purpose, are only to be obtained by draining in the sod. In addition to these considerations, many experienced farmers are of opinion, that the exact place for the drain can be ascertained with more precision, when the land is in this state, than when it is in tillage. In this opinion there seems much truth; for the growth of the different grasses and other plants above and below the spring, in general, indicate its situation, of which direction the operator is deprived, when the ground is stripped of its verdure by being turned over. In making the drains, they must be sunk until the spring is intercepted, and, before filling, cleared out. Stones are always used, where the land produces them; where it does not produce them, sods are employed, or brush-wood; if both these can be obtained, the duration will be longer, and the effect

effect more certain ; for then the drains may be filled nearer to the surface, without so much danger of being hurt by the feet of the cattle, which pass along. Where the drains are to be filled with stones, great care is usually taken to lay the first rows, so as to give free passage to the water ; after that they are thrown gently in, care being taken not to strike the bank so as to cause any of the earth to fall in. When the stones are sufficiently high, they are levelled, and the whole covered with any substance, that will keep the mould from getting between them. Straw is often used for this purpose ; but green rushes, which last much longer, are better.

Where springs only partially break out, and where the natural declivity of the land facilitates the course of the water, this operation is unattended with many difficulties, that follow the draining of flat grounds with a tenacious understratum, such as many of our most valuable soils possess. Parallel drains, at such intervals as circumstances point out, and ending in one main cut, have been found, in many instances, to answer perfectly well ; and, though the first discharge does not ² promise much, the constant oozing of the water from the ruptured mass, that lies underneath the vegetable
mould

mould, performs a cure, certain, though slow; and, from having seen the success, that follows the breaking through it, in some small experiments, merely by lengthening the coulter of the plough, I should be much inclined to think, that the instrument called *the miner*, which works in the same, though much more effectual method, might with great propriety be used in flat grounds, that require the sub-soil to be disturbed, at intervals not distant, to assist in the descent of the surface water through it.

The instrument, called a *miner* by Dr. Anderson, and used for this purpose, consists of a strong plough, constructed so as to admit of several stout coulters being inserted into it; these rip the ground without turning it; and the cuts being made to end in an open drain, and to whatsoever depth is necessary, discharge for some years the water, that otherwise could not be got quit of without such a number of parallel drains as must require great labour and expense. When the discharge ceases, the work may be repeated. It must be understood, that a plough of this construction is not adapted to rocky grounds, where, of course, it cannot work. But such obstructions do not often occur, where it is required. In using this machine, the force required must be according to the depth and
tenacity

tenacity of the ground ; in many cases, four horses would be required to do the business with effect. The coulter is arranged in this form,  where three are used ; the beam fastened to the handles by strong pieces, placed angularly, in each of which one of the coulters is fixed, and these are lengthened or shortened by screws.

The most difficult task to accomplish, in draining, is the banishment of the different species of the juncus : nothing less than the complete drying of the soil, and repeated tillage, can subdue them : and often, when the latter is given up for some time, they return, though in diminished numbers ; for the seed will continue fresh for an indefinite time,* and will grow on land, that is not too moist

* As a proof of this, the following circumstances deserve to be related. An orchard had been planted at Waringstown many years ago, on ridges of earth brought for the purpose, to obviate the wetness of the soil ; these ridges were removed by the present Mr. Waring ; immediately on their removal, innumerable plants of young rushes came up, that had been buried under the earth, but at too great a depth to vegetate. Cultivation and draining have now destroyed them. And to shew how fatal a want of moisture is to the juncus tribe, I mention, that at Lathfield, some years ago, a quantity of the toughest and most rushy sods were brought, to make up a piece of ground near the house ; as soon as these were laid the rushes were cut, which never more made their appearance—whereas, if they had been re-planted in wet ground, they would have grown vigorously.

moist for other purposes; here, however, digging them out will be sufficient to prevent their spreading, if the draining has been effectual. If it has not been so, it is only a temporary relief; nor will any of the various other methods prescribed for their destruction prove otherwise, if this essential work is not completely done.

SECT. 9. *Paring and Burning.*

So much has already been said on the advantages, which attend the application of fire to land, and of substances which have been exposed to its influence, under the article of manures, that it may be deemed unnecessary to add any thing further on the subject. But in certain situations this operation is attended with so many favourable circumstances, and so much may be performed by the judicious application of it, when other means are deficient, that I should think it wrong not to endeavour to shew, that this mode of manuring under proper management must be highly beneficial. It is to the injudicious treatment of the land after burning that the prejudice against it must be attributed; and the same injudicious treatment, after any other manure, would have an effect equally hurtful. If, instead
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of repeated crops of grain, turnips, rape, or potatoes were properly interposed, or, where these may not take place, if grass and clover were introduced, the result would be very different from what it has hitherto been; and, if practised according to the principles of a right system, would, in the county of Antrim, where there are such extensive tracts of soil adapted to the purpose, and so distant from other manures, be attended with the most beneficial effects.

Though the elements of fire and water are so essentially different in their natures, yet in some circumstances their beneficial effects may be said to resemble. Burning and irrigation are both furnished on or near the spot; the manure they afford robs nothing else of its share; it only requires labour, and affords wherewithal to enrich other grounds. It has been supposed, that burning destroys the staple of the soil, and from hence a strong prejudice has been excited against it; but, from all the accounts collected on this subject by Mr. Young and Mr. Marshall, the contrary appears to be the fact; and the injury done is from improper subsequent management, not from the operation itself, which is recommended by both as a speedy and effectual mode of bringing strong soils, or even lands of a thinner kind, into good order.

SECT. 10. *Irrigation.*

After the several remarks, that have been made on this subject in other places, there is little to be added, except that at Mr. Grimshaw's, on the road between Belfast and Carrickfergus, it was successfully tried; and, from Dr. M'Donnell, I have learned that Mr. Farrell of Larne had reason to be satisfied with his experiments in the same line.

I have mentioned, that Mr. Templeton saw it at Slemish;—there may be more instances of its practice, but I have not met with any of such extent as to deserve particular notice. But the facility of performing it, and the advantages attending it are so great, it is a matter of surprise it is not more generally resorted to; the mouth of every drain is a resource, where the declivity will admit of applying it; and the very water, which being pent up in the earth is destructive, when a proper direction is given to it by the hand of man, becomes a source of plenty.

Live

SECT. 11. *Live Stock.*

The intercourse, which is the consequence of the numerous fairs and markets, has made such a mixture in the breed of cattle, that there is hardly a real native sort to be found; but still on the mountains and high grounds the cattle are in some degree different from those of the low lands; they have thicker necks, more upright and shorter horns, and their hinder parts are not so full; their hair is coarse and long, especially towards the winter season; but they have fine backs, and, when put to good grass or winter food, take flesh well, and turn out profitably in tallow. The cows seldom come to be above three hundred and a half in weight; but the bullocks sometimes arrive at one hundred weight more, when between four and five years old. Upon the whole they are a valuable kind of beast for the coarser grounds, as they are very hardy, the thickness of their hides and hair being a good protection against the rigorous climate, which they inhabit; the cows do not give much milk on their native soil, but the quality is good; numbers of them are of a dark brindled colour or brownish black, and bear a strong resemblance to the Scotch cattle, to which they

they seem to be allied; but, whether they are the original, or derive from them, it is not easy to determine.

The first attempt at improving the breed of cattle, by the importation of a superior kind from England, was made by Lord Masserene in 1735; they were of the long-horned kind, and, though not exactly of the same appearance and shape as the new Leicester breed, they were very fine beasts, and grew to a very large size; their descendants are still in existence in many parts of the country, and around Antrim, but much mixed with other breeds; yet still to be distinguished by those, who were many years ago acquainted with the original stock, from the cattle of other parts. An idea of the value set upon them, after their first introduction, may be formed from the price at which year-old bulls were sold, as I find that five pounds were usually given for them at that age, which in those days was not much inferior to the fancied value set upon the present fashionable breeds; for, at the same period, the value of an ox is known to have been from two pounds to two pounds five shillings. There was likewise a fine breed at Castle Upton, which I believe are now dispersed; some of these, which were at Red-hall, were beautiful and came to a great size. About
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the year 1776, Mr. Lesly, of Lesly Hill, imported a bull of Mr. Bakewell's breed; the stock reared from him were very fine; I saw numbers of them at his different farms; as distinct breeds none of them now exist, but they all contributed their share to the general improvement. A few years ago Sir Henry Vane brought a bull and some cows from Durham to Glenarm; they were of the short-horned breed from Collins; they were large and well shaped, of a fine deep red colour mixed with white, but reckoned too heavy for general use, though the soil about Glenarm castle, where I saw them, was fit for beasts of very great size; but the climate, I have heard, did not agree well with them, and they have been sent back. The Marquis of Donegall has imported cattle of a very superior species from Astley successor to Bakewell; it is almost unnecessary to say they are of the long-horned breed, and of the very best kind, which is implied by mentioning the breeder's name. A cow from this stock was lately killed in Belfast market, which weighed nearly eight hundred weight, of six scores to the hundred—the beef of the best quality. This cow was fatted on turnips at a farm his lordship has in the county of Antrim. Mr. Watson of Broohill breeds from the country cows and a bull of the Leicester blood, and has fatted
 bullocks

bullocks, that were worked, to ten hundred weight and upwards. Mr. M'Neil of Larne prefers the Dutch to any other sort for milking; they are black, with some white, and have very small heads, necks, and horns; they are rather high-boned, but square behind, and, when in good condition, have smooth and shining coats; but their skins are very thin, which does not appear to be adapted to this moist climate. Some time ago the same gentleman imported a highland bull, but he did not much approve of his progeny. As this is not a county where many cattle are bred, except what are necessary to keep up each person's stock, so much attention is not paid to the quality as there is in other parts, where breeding forms part of a more extensive and more regular system; yet still, as cattle constitute so large a portion, in every country, of the farmer's profit, it is an object of consequence to obtain the best kinds, that are adapted to soils and situations. To the mountains and high grounds their own native breeds seem well suited; but even they might gain something by a proper cross with other breeds, provided they are of hardy kinds; and those, descended from the long-horned, seem to possess the quality more than any I have observed; many heifers of this kind are bought every year in the western counties, at two or three years

years old, and sold out the following spring in calf; this is a very profitable business on coarse lands; it however requires great skill and attention, as well in the laying in of the stock as in the time of selling out; if the heifers are disposed of before winter, they are generally warranted in calf, which, it is said, experienced dealers can ascertain with great certainty.

In rearing of cattle, they are in most cases fed from the pail, few being allowed to suck, which for making good beasts is certainly the better mode; and, where two are put to a cow, it is thought to be profitable, for they may be weaned after three or four months; and then there may be fresh ones put on, or the milk is disposable to other purposes. I was informed by Mr. Hunter's (of Ballymagarry) steward, that in this way the cows paid well; the calves reared thus were kept until they were fit for the dairy or for fattening. Many calves are every year vealed for the markets; of these Belfast consumes a great number; and, as it is regularly supplied, the business is of course found to be beneficial to the farmer. There is nothing on this subject, that I find particularly worth noticing, nor on the subject of rearing, except that the farmers, in the latter case, are often too frugal of their new milk, putting the calves to skim-milk

skim-milk very soon, and often to butter-milk, which, if they survive, renders them big-bellied, and in other particulars weakly. In truth there are few instances of the young of any animal, that recover the effects of scanty or of improper diet; it is a miserable kind of economy, and in the end defeats itself.

SECT. 12. *Dairying.*

There is no regular and general system of dairying in this county; it is merely one branch of the economy of a farm. Cows are kept as part of the farming stock, and considerable quantities of butter and cheese are made; but they are not often the first object, though a most beneficial one when properly managed. The general mode is, to keep as many cows as the ground, that is not in proper condition for tillage, will afford; and, when the farmer has the proper ideas of a farmer, to assist them in summer with clover, or some other soil, in the house, especially in the months of August and September, when there is a failure of grass. In the neighbourhood of Belfast many people keep their cows mostly on clover, by this means making more of one acre
of

of land, than could be made of three in the usual mode. Where farms lie near the mountains, so that the holders have access to them, in that situation most of the low and better lands are in tillage, and the mountainy part devoted to the cattle; but, to do well, they must be assisted by clover or grass cut for them, and given when they are driven home at milking-time. From the number of cattle, kept in this and the former way, considerable quantities of butter are every year made and put up in small casks, and sold in Belfast. In gathering the milk for churning, nearly the whole quantity, that comes from the cow, is strained into large crocks after being cooled,* or, if the number of the cows is great, into wooden vessels; when it has acquired a proper degree of activity, which in summer soon happens, the whole is put into the churn; by this means, though a small quantity of butter is obtained from the quantity of fluid, in proportion to that which is obtained from churning the cream alone, yet all the butter contained in the milk is gathered; and, the milk having stood a much shorter time, than it would require to

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* If the warm milk is mixed with the cool recent milk already put up, it makes the butter speckled with white (vulgo, pinrowed) and often gives it a bad taste, besides diminishing the quantity, and making it swell in the churn.

procure a churn-full of pure cream, the butter is supposed to be much more free from any rancid taste than in the other mode; and the milk (butter-milk), which remains after the operation, not having had time to be in any way corrupted, is a most pleasing wholesome beverage, and one of the greatest comforts of life to the Irish farmer, his family, and domestics; it is their common drink at their meals, and when they are dry and weary; when boiled with oatmeal, it is a most grateful and wholesome food, in addition to which it must be observed, that one pound of oatmeal, prepared in this way, affords more nutriment than double the portion, either boiled in water, or made into bread (cakes). The females who milk, and manage the dairies in this county, have great credit for the care they take in scalding and cleaning their utensils. As a proof of this, I need only mention the high price of the butter shipped at Belfast, and the small quantity of second or third quality, which goes from that port. The butter, which is bought at Belfast for exportation, is all exposed at the public weigh-house; it is made up in small casks (firkins)* containing generally about sixty pounds, and a few of thirty. It is tried by putting an augre to the bottom of the cask, and, according

* These casks often contain 10 or 12 pounds more.

ing to its quality, which is judged of by its taste and colour, (which last is particularly attended to) it is marked 1st, 2d, or 3d. The mark, that denotes an inferiority of butter, is called a score, and for each score two shillings per cask, or firkin, are deducted from the price.

A very difficult thing to ascertain, is the quantity of butter made from each cow, this depends upon so many circumstances; but I think, from the best information I can obtain, that, after supplying the demands of a family consisting of six or seven persons, from 70 to 100 pounds weight of butter may be sold from each cow. I know that more has been made, with the best management, on the best soils, but much oftener less. The price of salt butter has been, for some years, from eleven to thirteen pence per pound of sixteen ounces; from this the price of the cask must be deducted.

Considerable profit is made by keeping cows in Belfast and its neighbourhood. The grains from the numerous breweries are applied to feeding the former; the latter, in summer, are at least assisted with clover, in winter with kail, turnips, boiled oats, &c.

In addition to the profits arising from the sale of butter, must be added the assistance the
buttermilk

buttermilk affords in maintaining swine, the rearing of a calf to every two cows, and the making of skimmed-milk cheese.

The reputation of Ireland for making cheese is certainly not equal to its reputation for making butter; wherever it is made, it is, as with butter, an appendage to the farm, not the chief object. Carrickfergus and Antrim have been long celebrated for their cheese. The soil around these places is of an excellent quality, which, without doubt, must contribute largely to the goodness of it; but the mode of obtaining the milk must be the cause of the superiority of their cheese more than the soil, which in many places equals theirs. To procure a sufficient quantity of milk for making a cheese, twenty-five or thirty pounds weight at once, a number of people join; all the milk of one day is taken to the house fixed upon, and the cheese is made nearly in the same manner as the best English. This mode is called neighbouring, and goes regularly round the club or set. By many people these cheeses are thought to be nearly equal to the Cheshire. At Dunluce, Mrs. Moore keeps a regular dairy for cheese, one of which is made every day during the season, except Sunday. She uses whole curd, pressed till it is dry; salts, rubs, and turns frequently; makes
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one hundred and a half weight per cow, besides rearing every calf. Something is likewise made by churning the whey. This cheese, being kept until it is of a proper age, is much esteemed, and consequently much sought after; it is sold at 3*l.* 10*s.* per cwt.

A considerable quantity of skimmed-milk cheese is exposed for sale in Belfast, and other markets; the price of this from 3½*d.* to 4½*d.* per *lb.* New-milk cheeses are also made by many farmers, and sold from 6*d.* to 8*d.* per *lb.*; and, where the number of cows is sufficient to allow of one cheese being made at three milkings, they are often good. The great deficiency in our cheese-making seems to arise from the too long time, that is allowed to elapse, before the whey is got completely off; for, wherever it settles on the hardened curd, mouldiness is the consequence. In Cheshire the cheese is finished, as to pressing, in twenty-four hours; whilst this operation is going on, the makers are all the time employed in running sharp sticks through the holes of the vat to the centre of the cheese, which gives a free passage to the moisture, and renders longer pressing unnecessary, which, when continued beyond a certain time, brings off the rich parts of the curd along with the whey.

SECT. 13. *Horses, Mules, &c.*

There is a very hardy, strong, though small, race of horses, some bred in the county, and others introduced from Scotland, much in use on the northern and north-eastern coast, and in the mountains. They are very active and sure-footed, but few of them exceed fourteen hands high, and many are much lower. They are employed for every purpose, as far as their abilities will go, and sometimes farther than they ought to be. A little food will support them in a working state, and, when they are more plentifully supplied, they turn out very well for small weights on the road, though, from want of early attention in breaking, their mouths are often bad, and their tempers not so pliable as might be wished for. In shape, their defects are, want of height and length before, and, behind, their hams approach too close; but their backs and limbs are excellent, and their paces far above what would naturally be expected from their apparent strength, being equal to support a journey of equal length with a horse double their bulk, when not unmercifully loaded. A breed of horses similar to these, but smaller, is found in
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the island of Raghery; they are very sure-footed, and, for their powers, very serviceable. Of horses larger in size, and higher in price, there is not by any means a sufficient number bred in the county of Antrim, to supply its consumption, though every year a great number is sold, at the various fairs, to dealers from Dublin, England, and Scotland. The farming work is mostly performed by young horses, that are bought in with a double view; first, to go through the necessary operations of labour, and, secondly, to be made up, when that is over, for the markets, of which there are many well known for the useful and often very fine cattle to be met with at them. Of these markets or fairs, Ballyclare seems to be the greatest resort of the dealers, the farmers in that neighbourhood being accounted very good judges of horses, and well skilled in the art of making up for sale. There are also many other places, where horses of a good description may be procured, as Mount-hill, Park-gate, Old-stone, &c. In these latter years there is a great change in the kind of horse brought to market in the north of Ireland; the species seems to be improved both in figure and in movement; and the black horse, with legs overgrown with long hair, has given place to a kind, whose limbs are much finer, and less encumbered

encumbered with flesh. In colour, also, a manifest alteration has appeared; bays of different shades, and chestnuts, being at least in equal numbers with blacks; and most of the stallions being of these latter colours, the proportion in their favour is likely to increase. A great deal of this is to be attributed to the introduction of blood horses as sires, and likewise the other improvements, that have been observed; for although, in the first instance, the cross between heavy mares and high-bred horses may produce an awkward animal, in the course of breeding improvement will be obtained, and its advantages, under judicious corrections, will remain.

Mules.

Mr. M'Neil, of Larne, imported from Malaga, some years ago, a very fine ass, from which he has bred a number of mules; the ass, in form and movement, a superior animal; his height, I think, above fourteen hands. At the time I saw him, his coat was smooth, and his whole appearance handsome; his head not of that heavy dull cast so common in our unfortunate creatures of the same species; when he was mounted by his
keeper,

keeper, he shewed spirit, but no bad temper, and his paces were strikingly light and agile. The mares, from which Mr. M'Neil bred his mules, being of a good description, the progeny have turned out valuable, both in performance, and in looks. Many of them I saw at work, and there was no appearance of stubbornness in any of them. This gentleman speaks highly of their powers, and of the facility with which they are trained and supported. In this commercial country, where, of necessity, there must be so much land-carriage, this useful, hardy, and frugal quadruped would certainly pay well for both its rearing and keeping; for, though its longevity is almost proverbial, it is at an early age fit for work, and is sold at a high price.*

Sheep.

The county of Antrim sheep are at least as nearly allied to the Scotch breed with mottled faces, as the mountain cattle are to those of

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Scotland,

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Since writing the above, I have seen an advertisement, in the Belfast papers, of another Spanish ass to be let for breed at Muckmore, near Antrim.

Scotland, both having evident marks of the same origin; and at present there is a constant intercourse between the two countries, as those reared here are not sufficient for the demand. Many gentlemen in this part of the kingdom buy them in for their own tables, to which, from their size, they are well adapted; and also, from their being allowed to arrive at a proper age; a circumstance, in the opinion of connoisseurs, so essential to the constituting of good mutton.

Those sheep are mostly bred on the mountains, and are to be met with at the fairs in those towns and villages, which border on them. They are not a fine-woolled sheep, many of them resembling those, that are brought immediately from Scotland, with long pendant fleeces; others have them of a better quality; and it is observed that, in this particular, they improve when brought to a better soil and climate. Their weight seldom exceeds fifteen or sixteen pounds per quarter; but, when they are suffered to survive a second year, they often approach to twenty pounds. The mutton produced by them is fine-grained and well flavoured. Many, both of these, and those immediately imported from Scotland, are bought up by jobbers, who drive them even to the county of Down, which formerly reared nearly a sufficient
number

number of small sheep, for the same kind of consumption, on and near the mountains of Mourne.

The introduction of the new Leicesters has been confined to a few; the Marquis of Donnegall and Sir Henry Vane have imported them; Mr. Watson, of Brook-hill, also has this breed, which he is now crossing with a tup of the Scotch; of this cross he cannot speak what will be the event, as this is only the second year of trial; if it proves as favourable as that between the Leicester tup and the common mountain sheep of the county of Derry, he will have reason to be satisfied with it; for I have seldom seen a better kind of sheep than those are, which this intercourse produces, giving the mildness though not the weakness of the improved breed, and rendering the flesh finer and better flavoured, and still retaining in a great degree their original propensity to fattening, which the savage wildness of the mountaineer often renders difficult to accomplish, unless they are trained by the example of a few, that are reclaimed. Except in the mountains, flocks of sheep are rare; the markets are supplied with mutton by the farmers, who keep a small number, or by bringing them from the sheep-feeding counties, especially from Louth. In consequence of the small number of sheep, no particular

ticular attention is paid to having very early lambs, which in the beginning of the season are dear, and not remarkably good; the prices of Belfast might act as a stimulus to farmers in the neighbourhood, as breeding ewes kept for this purpose, under proper management, pay well.

Swine.

In the breed of swine there has been a great change for the better since the beginning of this century, which is to be attributed to the importation of the most approved kinds from England. About ten years ago the Rev. Dr. Percy first brought the true Berkshire to Maralin, and the Rev. Wm. Moore, of Mount Panther, likewise about the same period; the advantage was so apparent, that very high prices were given for their offspring; which, with other similar importations, being diffused through the country, the farmers, who kept breeding sows, had recourse to them; and this species, though not unmixed, is very general through the northern counties, and have nearly superseded the old long-legged, tottering, flat-sided animal hitherto reared. In using the word, unmixed, I must observe, that a cross of the old breed is thought to be of general utility; for,
though

though the animal produced may not be quite so perfect in all its shapes, it is found to attain a larger size in a given time; the females also are more prolific, and are better provided with milk than in the pure breed. Besides the Berks kind, we have the Dutch both white and black, originally, I should think, from China, and another sort very well shaped, with ears that hang down, but with legs longer, and backs not quite so straight as the Berkshire with pricked ears; these seem to have come to us from the west of Ireland, where more attention to these objects has been given than in this commercial country. But, of what consequence it must be to have the best breed of swine in these counties, the numbers sold during the salting season at Belfast will shew; for I am informed that, during the period this business has continued, from its commencement in 1810 until near the end of it in the year 1811, not less than seventy thousand pigs have been brought there for exportation, which, taken one with another, weighed at least two hundred weight of six score pounds each. A considerable portion of this is prepared for bacon, and dried in houses erected for the purpose, the Belfast bacon having a very high character in London. The feeding of these swine is not, however,

ever, confined to this county; they come from many distant ones, even as far as Monaghan and Tyrone. The pigs for fattening are either laid in when just weaned, or afterwards at a more advanced growth, all the markets and fairs offering a regular supply, and scarcely a cottage is without one or more; the occupier, if not able to give the finishing, is at least willing to gain part of the advantage from the growth of the creature for a few months, especially at the time his potatoes are in plenty, the refuse of which, with the little food it can pick up for itself, keep it in a state of growing, that leaves some profit for its feeding. Swine are not usually confined, whilst they are fattening; their styes are not shut, which gives them an opportunity of taking rest or exercise as they like; this liberty preserves the appetite, and makes the flesh firm. Their food in summer is potatoes, and grass or clover, which is either given to them at home, or gathered by them in the pastures; when the time of killing approaches, potatoes and oatmeal, or oatmeal seeds;* these are the siftings of the oats after they are deprived of their husks at the mill, and ground; either

* This is similar to the bran of wheat-meat; and, when steeped in water, the produce being strained and boiled, makes a jelly called flummery, or sowins.

either of these are favourable additions for their acquiring fat ; but plain oats, though they are not so rapid in their operation, lay the foundation for pork or bacon of the best qualities.

It has been said, that the swine of the north of Ireland are killed at too early an age, most of them not exceeding a year and a quarter, and scarcely any of them reaching two years old ; but, whilst our pickled pork keeps up its character in foreign markets, and that our bacon has credit in the London market, that objection seems not to be well founded ; and, as the greatest profit on pigs is thought to be made, whilst they are growing, as well as fattening, it seems the general idea, that they will not pay adequately for their being kept alive for a much longer time. Amongst the encouragers of the improved breed of swine, I have noticed the Marquis of Donegal, Mr. Stewart of Willmount, Mr. Hunter of Ballymagarry, where I saw them several years ago, and Mr. Watson of Brook-hill, and as these animals have young twice a year, the rapidity, with which they spread after their character is established, is great. I must not omit the name of Wm. Crooks near Spencer's bridge, who was early aware of the advantage of the improved breed, and who by judicious crosses has established his reputation as
a breeder

a breeder, having obtained from the Berkshires, first imported, and the native well chosen sows, some of the finest hogs I have seen. However, he still persists in renewing every three or four generations from the native swine, for the reasons given above.

Rabbits.

There are no regular warrens in this county, little of the soil being adapted for this kind of stock; but there are numbers scattered over it. The soil, that is fit for them, is much better employed, being under excellent cultivation.

Poultry.

To that excellent root, the potatoe, may be attributed the great number of poultry, that are reared throughout this kingdom. In arranging the potatoes for use, the first quality is reserved for the diet of the family; on the leavings of these, after they are satisfied, the fowls, the cat, and dog are supported; sometimes with the addition of a little butter-milk and oatmeal; for, let the economy, with which this root is expended, be ever so strict, there is always something left

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at meals, which is thus usefully employed in bringing on another article of food for man.

There is scarcely a cottage, that does not rear one or more broods of chickens or of ducks, the former of which are generally much earlier, from the fowl usually roosting under the roof with the family, as the warmth imparted thus renders the hens sooner prolific in the spring; and, the attention not being called off by a variety of other stock, more care is taken of them than in larger concerns, where they are also reared in considerable quantities. To the latter the breeding of turkeys and geese is mostly limited, as they require a large range, which the confined situation of the former does not admit of.

In the prices, and consequently in the rearing of poultry, the influence of the town of Belfast is very extensive, a number of carriers being constantly employed in collecting the different kinds and selling them there; these people go to a great distance through the adjoining counties in the commencement of the week, that they may be ready for market on Friday. The increased demand has certainly much encouraged their propagation, and at the same time has augmented their value, within the last ten years, to double what it was, and in some instances even more.

Chickens, which were some years ago bought at an early season for one shilling a couple, are now two shillings and six pence, and other kinds in proportion. There is a great variety in the breed of the common fowl, from the intermixture of different varieties introduced from other countries. The black fowl with white tops are much admired, from the contrast formed between that and the hue of the rest of their plumage; the brown and yellow breed is also much admired for their beauty, and the size and flavour of their eggs, but in hardiness and vigour the game-cock is unrivalled; this variety bears the vicissitudes of the climate better than any other; the hens lay earlier, and continue to lay eggs longer than most others, and some varieties grow to as great a weight as any imported. In the parish of Killead they are of a superior strength and stature, probably from the quality of the grain. Mr. Sampson has made the same observation, respecting the fowl in Myroe (county of Derry) which is also a district remarkable for its rich productions.*

Of the turkey there are three varieties, the large black with black legs, the white with white legs, and the copper-coloured with red legs. The first,

* Mr. Stuelair of Belfast has lately got a species of red fowl, which grow to a large size, one of which I saw at Mr. Templeton's.

first is reckoned to grow the largest, and to be hardy; the second more delicate in its flesh, but more difficult to rear; the third is the American breed, formerly so numerous at Moira, and at Portmore park, and still to be met with in the neighbourhood of Lough Neagh, though seldom unmixed. The legs of this bird are shorter, and set farther back than in the others; its body is also shorter and more compact; the skin white, and the flesh delicate; they are great wanderers, and very tyrannical in their dispositions towards the other fowls in the poultry yard.

The common ducks, which are but small, are extensively reared for the market and for keeping, as they are easily supported and lay a number of eggs; the Rouen breed has been introduced and is much spread, and has in some degree corrected the deficiency in the size of the former. About Carrickfergus they are in great perfection, and very numerous; between these and the Muscovy duck a mule is propagated; it is a very fine and stately bird, grows nearly as large as a goose, and is equally tender and well flavoured as the common duck.

Geese are kept by all farmers, the flocks numerous according to their holdings, for they are great consumers of grass. In the neighbourhood
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of Lough Neagh they seem to abound more than in any other part. I have heard instances of the longevity of geese, and well attested instances that say their age often reaches to half a century, and sometimes to more; from my own experience I cannot speak, but I believe it to be the case, and not unfrequently.

The price of poultry in Belfast market, which influences also the price to a considerable distance are—for early chickens, from 2s. 6d. to 3s. per couple; when the season is advanced about 1s. 6d. or 1s. 8d. per ditto. Ducks are also, early in the season, nearly double their usual price, which is about 10d. or 1s. Geese are sold from 2s. to 2s. 6d. Turkeys from 3s. to 4s. 6d. Large turkey cocks are sometimes as high as five shillings. This rise in the price, to near double of what they were twenty years ago, comes not from any deficiency in number, but from the increased demand.

Pigeons are very generally spread over the county, but not in large flocks, as there are very few pigeon houses.

On the management of bees I have little to say; for information on that subject I refer the reader to the Survey of the county of Down, page 207, where

where the superior mode of treating them is detailed, as practised by a gentleman in that county.

SECT. 14. *Rural Economy.*

In the management of farms, by those who make it their profession, all the principal operations are either performed by the owner himself, as far as he can do it, or directed by him in person; for, there are not many holdings of such magnitude as to enable the occupier to pay for superintendence. If the farmer has sons, they contribute their share, and, when the farm is small, they are often adequate to the whole work, and employ themselves, in the intervals of the farming occupations, in weaving or some other trade. When the farm is large, hired servants generally are kept, who live in the house, to assist in the performance of those works, that require daily attention; extra works being usually shared with cottiers or occasional labourers, who, from some circumstance, are bound to contribute their assistance. Most of the farming servants are capable of putting their hands to every business: in spring they are ploughmen; in a more advanced period of the same season, they can assist in setting potatoes, if done with the spade; and in summer and
autumn

autumn they are turf-cutters, hay-makers, and reapers; the reason of this is, there are few farms so large as to afford work in any one branch so entirely, that a servant can be devoted during the year to it alone. In reality, a man of this description must have considerable versatility of talents to be adapted to his situation, sometimes comfortable, sometimes otherwise, according to the master he serves, and to his own disposition. From this order of men the cottier arises, and sometimes, when they are industrious, the little farmer; and, when well conducted, they are a valuable and a necessary denomination of persons in the department of rural economy. These labourers are generally hired by the half year, the winter half commencing at November, the summer at May; as the labour of the latter is greater, there is a proportional difference in the wages; the first is about four guineas or five pounds, the second from five to five and a half guineas, with diet and lodging. Boys are often hired for the same periods; their wages also vary according to the season and their ability. Cottagers are paid partly in money and their diet, and partly by their holdings, which are rated according to the attendant advantages—such as the quantity of ground allotted for the garden, the quantity of potatoes

potatoes allowed to be set. The rent of a cottage and garden is from two to three guineas per annum, of a cottage alone from a guinea to a guinea and a half; or often of so much money and so many days work as are agreed upon—the work to be performed at such times as agreed upon. In these cases the cottager generally gets his diet the day he works for his landlord. Sometimes a cow is grazed; in this case there is a separate bargain for her. A house, garden, &c. and cow's grass, are valued from four to six guineas, the owner of the cow keeping her in winter food. The labourer, who is engaged in this mode, often works up his rent first—the difference his employer pays in money.

The larger farmers also engage, where they are in the neighbourhood of small farmers, some of their work in exchange for ploughing; so many days work for a day of his horses and men; this, where constant employment is not for them at home, is a very beneficial barter for the former. Women are also engaged to reap, by having flax-seed sown for them; the seed their own; the price of the ground paid by their work. All the young women in the country can reap, and at harvest they turn out, which, in this populous country, goes on rapidly, and most of the weavers give their assistance

sistance at this time. Reaping is sometimes engaged for, by the stook of twelve sheaves, from one penny to three-halfpence the stook. In the farms of this county there is not much job work except ditches, which are made by the perch of seven yards long. The price varies from 1s. 6d. to 2s. 6d. according to the depth and width, and the difficulty of the ground. The hours of labour are from six o'clock in the morning till the same hour in the evening, whilst the days are of sufficient length; half an hour is allowed for breakfast, and an hour for dinner; in harvest, unless a very early one, from the time the grain is dry in the morning until sun-set; at this season a very short time is spent at meals, especially if it be a late one. In winter, the hours of work are from sunrise until it is dark; breakfast is the only meal taken in the course of the winter's day. There is a mode of jointly ploughing in practice, where two small farmers keep each only one horse; the two form a team when in conjunction; this is called neighbouring, and is a very convenient resource to both parties.

CHAPTER III.

GENERAL SUBJECTS.

SECT. 1. *Provisions.*

Potatoes form the great basis of food, it is well known, to all the inhabitants of this kingdom, and in the county of Antrim they are as much esteemed as in any other part of it. In the gardens about Youghall, in the county of Cork, they were first planted. This benefit is ascribed to Sir Walter Raleigh, and with much probability; for this was part of that estate, which he sold to the Earl of Cork. When the person, to whom the potatoe was first given to cultivate, attempted to eat the apple (for want of proper instructions) he was quite unconscious of the advantages mankind were afterwards to receive from the root.*

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* *Oldy's Life of Sir Walter Raleigh.*—Authors differ much as to the country, from whence the potatoe came. Mr. Switoger calls it the Skirret of Peru. Dr. Hill affirms it to be a *Solanum* (certainly not the *solanum lethale*, deadly night-shade); and another gentleman of great learning says, it came from Mexico. They were known in Ireland a considerable time before they crossed the channel, and did not reach Scotland for near a century. — *Campbell's Political Survey.*

To potatoes oatmeal must be added ; with these two articles, and the produce of the dairy in summer, and a portion of salted beef or pork in winter, the unfastidious palate of the occupier of the soil is well satisfied. The very general use of potatoes gives a species of plentiful appearance to the repasts of the lower orders, in Ireland, that, I have heard, they do not possess in any part of Europe, where the use of them is less known. It is calculated, that a family of six persons will consume four bushels of potatoes in eight days, if their only food, which is often the case in the latter end of summer, or in autumn, when the stock of oatmeal grows short. At other times they are only used for dinner and for supper. Potatoes, mixed with meal of any kind, make a good and wholesome bread ; but it will not keep long, without becoming mouldy or sour.

Oatmeal is prepared in a variety of ways, and, although with justice esteemed a wholesome food, is not thought so good, without a change, as potatoes are, those who live entirely on it being sooner cloyed than with the latter. Boiling flesh-meat is accounted the most economical mode of using it, as in this way, with the addition of groats or oatmeal, and different kinds of herbs, particularly cabbage or turnips, a small portion of it will make
a savoury

a savoury and wholesome meal for a family, especially in the chilling days of winter, when it is most frequently prepared; and the comfort imparted to a labouring man, who has for the day been exposed to the inclemencies of that season, by sharing in a good mess of this kind, is very great, as nothing so much contributes to the restoring of the human frame to the proper degree of heat, if it has by any means been deprived of it, as the imbibing of a warm liquid. The quantity of animal food, that is consumed by each family, is regulated by their circumstances; but in the houses of farmers they seldom sit down to dinner without some proportion of it, and, in prosperous seasons for work, few tradesmen are without their salted beef or bacon. Salted fish do not often find their way to the farmer's table, herrings excepted, unless on the coast of Lough Neagh, where the trout and eel are saved, and on the sea shore, where they are to be procured cheap, and without difficulty. As gardening gains ground, many vegetables are added to the diet of the farmer; these may contribute to vary the general uniformity of it; but, whilst the potatoe remains, it continues the unrivalled occupier of the farmer's board.

SECT. 2. *Fuel.*

To the north of Lough Neagh, and the Six-mile river, this county is well supplied with turf-bog, few situations being at any great distance from it; in the more southern parts it is much scarcer, being in many places entirely confined to the mountains, where the fuel prepared from it is certainly of excellent quality, but difficult to be procured; in some places, the peaty substance is only the depth of one turf; in cutting this, the sod is carefully taken off, the turf cut, and the sod restored to its place, which, from the moisture underneath, soon resumes its verdure; when the depth is greater, these bogs are treated in the usual way. Fifty years ago there were numerous bogs in the barony of Masserene; they are now reduced to few, of which that on the shore of Lough Neagh, called the Nuntagh, is the only one of any extent remaining. Though the quality of the fuel obtained from it is very light, it is carried, from necessity, to a great distance, the inhabitants, from custom, preferring it to coals, which upon the whole might be cheaper. On the northern coast the Ballycastle collieries give a supply
of

of fuel; and they are carried a great way inland for the supply of the black-smiths shops, &c.; not as many of them are carried to Belfast, as might be expected, that town and the neighbourhood being supplied mostly from England and Scotland; the salt-works and lime-kilns on the coast are, nevertheless, furnished with fuel from them, and a considerable quantity is regularly conveyed on cars to Coleraine—these coals are pleasant, but swift.

SECT. 3. *Roads and Bridges.*

Amongst the many improvements, which have taken place in this country within the last half century, none have added more to the comforts of the great body of the people, nor have contributed more to give them an increased degree of civilization, than the attention paid to the making of new roads, and rendering the old roads more passable. If some generations were supine upon this subject, the present is making ample atonement for it. This subject is now so well understood, as to preclude the necessity of saying much upon it; but some objects seem to require notice. When roads are made to slant along the sides of steep mountains, they are liable to much injury from
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the torrents, which rush down at particular times; a precaution against this mischief has been found effectual, on the mountain between Ballycastle and the Glynnns:—a large drain has been cut above the road, at some distance from it; this intercepts the waters in their course, which are conveyed, by means of this cut, to a bridge, or large pipe, which carries them off without any injury to the road, whilst, in other such situations, where this precaution has not been attended to, the roads have either been in part carried away, or such chasms have been formed in the sides, as to threaten their total overthrow, and, whilst they stand, render them extremely dangerous.

The roads, which run through the numerous turf-bogs, offer another object for consideration. In most parts, where they have been made for any length of time, they are grown very dangerous; for, having first been laid out too narrow, they are made more so by the depredations committed on their sides, from drawing the turf out of the bog on each hand, sunk many feet below its surface, so that nothing is left but a narrow stripe with a double precipice. To spread these roads, and gravel them afresh, has in some instances been done; but the most effectual method seems

to

to be, the making a new road along the side of the old; probably this would be as cheap an expedient as the other, and would have the advantage of not interrupting the communication. In making roads through bogs, a sufficient breadth should be left to admit of a bank being thrown up towards the road; this would be as complete a security as the filling up the trenches on other roads, which undoubtedly is among the greatest modern improvements in our highways, whether considered in point of safety to the traveller, or as a preservative to the roads, which every year being in part trodden into the ditches, the water was dammed up, and the road either overflowed, or so much softened by the moisture as to be soon worked into a slough. Springs, breaking out on the hilly parts of roads, require attention; these generally shew themselves in frosty weather; the water, being pent up by the hardness of the surface, raises the earth to a distance round, which, when the thaw comes, immediately sinks into a deep hole, for which the only effectual remedy is a covered drain, made above the spring, and sunk sufficiently to prevent it from rising to a level with the covering of the road; where the subsoil is a stiff clay, an occurrence of this kind will often render a road, in the course of one winter, nearly impassable.

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The materials for making or repairing roads are whynstone (basalt) in all its various stages of hardness, and gravel from the gentle swells, that abound in several districts. The harder sorts of the whynstone are excellently adapted to those roads, which are greatly frequented, as from their composition they are neither so convertible to mud in winter, nor in summer to dust. On the great road between Belfast and Lisburn the advantage of repairing with this substance is most evident, when compared with the slaty substance brought from the county of Down. Near Lisburn, where the whynstone is used, the road is always in a good state for the passenger; but near Belfast, where the slate (schist) is employed, he is in danger of being drowned in mud at one season, or of being choaked with dust at another. It is said, and with truth, that from Drum-bridge to Belfast there would be great difficulty and expense in procuring the former; but, when once procured, and properly applied, its duration is so much greater, that in the end it would make up for the additional cost, which might not so much exceed the other as it is supposed to do; for a much smaller quantity will suffice than of any other material, as it has, when broken small, and reduced to an equal size, an extraordinary quality of resisting the attrition of the wheel.

wheel. For, where materials not equal in size are employed, they never can make a good surface for any length of time, owing to that agitation, which is caused by the passing of the wheel over hard substances of different magnitudes.

Since the establishment of mail-coaches, and so many other public vehicles, a degree of attention, unknown till lately, has been paid to the great roads, which are now carrying on in Ireland with such magnificence. Hitherto, from its situation, the county of Antrim has had little share in it, only part of the distance between Belfast and Lisburn, to repair, and that done by the turnpike receipts; of late, however, plans have been proposed for shortening the distance between these towns, and for avoiding the hills which occur. One of the proposed plans is, to shorten the road by keeping on towards Dunnurry, in going south, instead of turning towards Drum-bridge; this, on viewing it, certainly appears the shortest line, and the hills at Drum-bridge and Lambeg would be avoided by it. The other plan is, still to pass over Drum-bridge, but, a little way from it, to strike to the left through Lambeg bog; in this way the remaining hills would be avoided, but two new bridges would be required, of considerable dimensions, one over the canal, and another over

the river Lagan near George's weir; but in point of new road there would be a saving. It is also proposed to enter the town of Lisburn to the southward, in coming from Dublin, to avoid several hills; this would require another bridge over the Lagan between the Union locks and Lisburn; by it the hill in Bridge-street would also be avoided. The new mail-coach road from Belfast to Londonderry, by Coleraine, will traverse a great proportion of the county, in a direction from the south-east to the north-west, and, by facilitating the communication between those commercial towns, will be of essential service.

From observing the disadvantages, which the occupiers of districts bordering on the mountains experience during the winter, and much of the other seasons, in gaining access to the public roads, it must appear evident, that nothing could be more advantageous to those, who are thus situated, than roads made to run parallel to the bases of the mountains, and as high as circumstances would admit of;—these roads, by cutting the wretched ways, on which they are now forced to travel, often very far, would relieve these people from the distress they must experience, whenever their necessary business calls them from home.

The

The advantages of a road, made upon this principle, are fully shewn by that, which is made along part of the base of the Black mountain to the west of Belfast, laid out by Mr. Smyth; and the disadvantages a similar district labours under may be perceived by viewing the tract of country, which lies between the Cave-hill and Carrickfergus, to the west of the road which runs along the shore. Many other parts labour under similar, or even greater disadvantages; but to relieve all must be a work of much time, as the means of doing so are limited by the money, that can be raised. It is scarcely necessary to say, that the roads are made and repaired by presentment, which seems the best mode that can be devised, as the grand juries, which present, are composed of gentlemen acquainted with the country, who take care of those in their own neighbourhood.

Bridges.

The old bridges in this county are narrow, adapted to the ideas that prevailed respecting the roads, which were also narrow. The modern structures of this kind have kept pace with other improvements,

improvements, being broader and less elevated than formerly, and in every particular more favourable to the passenger, though, in the durability of the work, they have not the appearance of superiority.

Of the ancient bridges, that of Belfast over the Lagan, and which joins the counties of Down and Antrim, deserves particular mention; the whole, including the dead work, is 2562 feet in length, of this, the twenty-one arches, of which it is composed, take up 840 feet; it was built at the joint expense of the two counties, and cost about 8000*l.* some say 12000*l.*; probably, in the latter was included the expense of building up seven of the arches, which fell in 1692, having been weakened by the Duke of Schomberg's drawing his heavy cannon over it, as well as by a ship driving against it. The foundation of it was laid in 1682, and it was not completely finished for eight years after. The breadth of the arched part is only 22 feet, that of the dead work was originally only 19. This latter part has been widened, and is now become a spacious passage, and will, probably, soon be a street, several houses being built on it, and embankments made on both sides.

The most remarkable modern bridge is that at
Toome,

Toome, built by the late Lord O'Neil over the Bann, where the ferry plyed, between Antrim and Londonderry. By an act of parliament, the tolls of the ferry were granted to his Lordship, to whose memory every passenger must prove grateful, for changing his mode of crossing the river from a crazy boat to a solid bridge.

From the number of mountain rivers, which this county contains, a considerable expense is every year incurred by the county at large in building and repairing bridges; this, joined to the other equally necessary expenditures, amounts to a large sum annually, which, though levied from the occupiers of the land, is nearly all laid out amongst them.

SECT. 4. *Canals.*

In the original plan for making a canal from Belfast to Lough Neagh, there were two material defects; in the first part, which was executed between Lisburn and Belfast, the error arose from an idea in the projector of saving expense, by making the river Lagan serve for part of the navigation, which, having a fall of eighty feet between those towns, is very unfit for the purpose,
the

the banks, from its rapidity, being frequently carried away, so as to interrupt the passage, to the loss of the proprietors, and to the detriment of the public. In the other parts, from Lisburn to Lough Neagh, the error arose from not having a sufficient provision of water for the head level, from whence the fall to Lisburn is 36 feet, to Lough Neagh 70, and making the whole of it so large, as to require an unnecessary supply of water. The plan for remedying the first error is, to preserve as much of the navigation between Lisburn and Belfast as is independent of the river, making new cuts wherever they shall be required, and only touching on the river in two places, where it must be crossed, at Drum and Nave bridges.—That proposed for correcting the second error is, to turn the whole of the river Lagan, taking it up at Magheralin into the head level. Both of these schemes, if executed, seem fully adequate to the proposed ends; but, unfortunately, they clash with the interests of a body of men (the bleachers) which are so interwoven with the interests of the community, that to them the utmost attention is due, as they carry on the bleaching business to an immense amount along the banks of the Lagan, by whose waters their machinery is worked, and which would be much injured by directing them

them into the head level, as well as all the other mills that lie on the same water, amounting to eighteen in number. Much injury, it is said, will also be sustained by them, even in making the new cuts from Lisburn to Belfast.

The whole of this canal, until of late, was the property of the Donegall family, who completed it from Lisburn to Lough Neagh. It is now purchased by a company, who are very anxious to perfect a work so useful in such a trading country as this; but there are so many different interests concerned in the different plans proposed, that nothing for the present has been resolved on, except the repairing of those damages, that admit of no controversy.

Besides the plan above-mentioned of supplying the head level from the Lagan, Mr. Whitworth proposed to take the rivulet, which runs into that river at Costley's-bridge, by means of a cut into the head level, which could without great expense be done, his estimate of the cutting and sluices necessary being in the year 1768 not more than 316*l*.* The supply, which this stream affords in summer to the mills below it, is not great, and could only be effectual to the navigation, by dam-
ming

* It would now, probably, be double that sum.

ming up certain lakes, supposed to contain about 300 acres, from which this stream flows, and which, by means of cuts and sluices, could be drawn off when required. From the ground these lakes cover, at present, a great supply might be obtained by proper management; but, by overflowing more surface, that supply might be made permanent. Ideas have also been started, of supplying the canal by pumping from the river with a steam engine, or even from Lough Neagh. Of its efficiency to perform so great a work I cannot form a judgment; but, Lough Neagh being seventy feet below the level, one pump could not perform the operation. Upon the whole, it is a circumstance much to be desired, that some plan could be fixed on, which, without much private injury, could make this navigation more certain, so that it should not, in summer, be interrupted by drought, nor in winter by floods.

In the Armagh Survey it is said an estimate has been made, and is under consideration, for making another canal, from Lough Neagh to the sea, by the lower Bann, and the valley through which it runs, Coleraine to be the port; but the bar at the entrance of the river, always difficult, and often dangerous, seems to be a strong obstacle; yet a canal in this direction, to distribute

lute the importations of Belfast and Newry to the distant parts of Antrim, and to the county of Derry (even upon the supposition of the other port not answering) would certainly be beneficial; but, whether or not it would be adequate to the expense, it is difficult to say.

As the following papers refer to navigations, that were in contemplation at the period of the Union, and which, if ever carried into execution, would connect this county with the more inland parts of Ireland, by means of Lough Neagh, it seems proper to give them a place here.

*Proposal for making a Line of Navigation from
Dublin to Lough Neagh.*

It is proposed by several noblemen and gentlemen of the county of Meath, and of the manufacturing counties of the North of Ireland, the River Boyne company, with several merchants of the city of Dublin, and of the commercial towns of the North, to complete by private subscription, together with such aid as Parliament may be pleased to grant, a

Navigation canal, from the Royal canal at Blanchardstown, near Castleknock, in the county of Dublin, to Navan, Kells, Bailieborough, Monaghan, Armagh, and Lough Neagh.

The object of this undertaking is, to open a direct intercourse between the metropolis and the manufacturing towns of the North; and it is conceived by the proposers for this undertaking, that a canal large enough to navigate twenty-five ton boats on would answer the trade; and, in consequence of many locks being already made, rising from the city of Dublin to Castleknock, they think such a canal could be carried on very cheaply from thence to Navan, where another ascent takes place through the locks of the Boyne navigation to the level of the town of Kells, and the river Blackwater, at Clevin's bridge, three miles north of that town. The country northwards appears so fit for inland navigation, that no doubt can be entertained of being able to cut cheap canals through it. It is therefore most humbly hoped, if a line for a canal in this direction should be found to answer the expectation, that Parliament will be pleased to allow the undertaking to become a part of the intended system of inland navigation of this kingdom, and to a share of whatever bounty Parliament may grant to accomplish the same.

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The advantages, that would arise to the nation from this undertaking, are too obvious to take up the time of this honourable house with any comment on them.

A Proposal for making a canal from the city of Armagh to the river Blackwater, near the town of Moy.

In order to shew, that carrying into effect the annexed sketch of a line, for opening a navigable communication from Armagh to the river Blackwater, would be a work of public utility, the following reasons are most respectfully submitted to the Right Honourable and Honourable the Committee of the House of Commons.

From Armagh being the most considerable market in the kingdom for the sale of brown linnens, the manufacture of that staple article is carried on to a very great extent in its neighbourhood; but this manufacture is in danger of being most materially injured, from the great scarcity of fuel, which is such as to oblige the opulent inhabitants to use English coal, at a great expense of land carriage; and they have latterly, at inclement seasons, been under the necessity of subscribing
large

large sums, to procure that article at a low price for the poor, to prevent them from perishing.

Should a navigation be opened to Lough Neagh, it would give the means of a supply of turf from the extensive bogs in the neighbourhood of the lake;—would open a communication with the collieries at Coal Island, in the county of Tyrone, and bring English or Scotch coal considerably under the prices, at which they can now be procured.

An extensive trade in general articles of merchandize being carried on from Armagh, not only to its own neighbourhood, but to a considerable part of the counties of Monaghan and Tyrone, by opening a navigation through Lough Neagh to the ports of Belfast and Newry this trade would be very considerably extended, to the great advantage of Armagh and all those places, to which its trade extends, and would tend much to improve the public revenue.

To the great number of bleach-greens and flour-mills in the neighbourhood of Armagh water-carriage would be of the highest importance, as well for the conveyance of bleaching stuffs, coals, grain, and flour, as of timber, slates, and other heavy articles used in erecting and repairing the necessary buildings, machinery, &c.

In

In a large tract of country, from Blackwater-town to Lough Neagh, and from thence up the river Bann, and along the canal to Newry, (an extent of nearly thirty miles) there is no limestone whatever; so that lime can only be procured by land carriage, from a distance of several miles, which prevents its being at all used in that important national object, *Agriculture*.

Was a canal opened from Armagh, it must necessarily go through lands in that vicinity, containing inexhaustible quantities of limestone, which could be conveyed by boats returning from Armagh, at a very inconsiderable expense, to all that part of the country above-mentioned.

The cut, as laid down in the plan, would extend about five and a half miles, and, according to the estimate, would, when completed, cost from eighteen to twenty thousand pounds, about one-third of which could be raised by subscription.

To keep the works in repair, and pay interest to the subscribers, would require a toll of about six-pence per ton on all boats carrying coals, or any species of merchandize; but boats, laden merely with turf or limestone, might be charged only 2d per ton.

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The number of horses constantly employed in bringing coals, turf, and other necessities to Armagh, amount to some hundreds; two-thirds of these would, from a canal, become unnecessary, and consequently make a saving to the country of their keeping, attendance, &c. to a very large amount.

Should the Armagh navigation be carried into execution, it would be necessary to give the commissioners of it a power of laying on a very small toll on vessels coming into the Blackwater from Lough Neagh, to enable them to clear, and keep in order, a cut which was made many years ago, (as marked in the plan) to avoid a sand bank in the mouth of the river Blackwater.

June 20th, 1800.

SECT. 5. *Manufactures.**Linen.*

Though an inquiry into the origin of the linen manufacture in this kingdom may be deemed rather curious than useful, and consequently foreign to the purpose of this work, yet a few introductory remarks may be made respecting its claims to a remote antiquity, without encroaching much on the reader's time.

It is generally allowed, that the manufacture of linen originated in the East, as well as most other arts and sciences; that the Phenicians, who carried it on at an early period, (and who might have learned it in their trading intercourse with India), first planted colonies at Carthage, and in Spain; and, as it is asserted by the Irish historians, passing from thence into Ireland, they brought with them the knowledge of this art, and with it those useful inventions, the spindle and the loom.* As a further presumption of this eastern origin, the word *Indic*, which (according to Cormac's

* Dr. Stephenson's Essay on the linen manufacture, in the Papers of the Literary society of Belfast; 1st fasciculus, of which the writer has made a free use.

mac's glossary) signifies linen in the Irish language, is adduced to shew, from its similarity to the appellation, India, that part of the world, from which it was ultimately derived; and, among the many arguments brought forward to support the claims of the Irish to an eastern descent, the early knowledge they possessed of the cultivation of flax and the making of linen are, by the advocates of that descent, thought not to be the least strong. But, not to intrude farther upon so difficult a subject, it is most evident, from the very first English writers upon Ireland, that linen made in their own country formed an essential part of the dress of the ancient Irish people at the time of their writing, and consequently that it must at that time have been a general manufacture, which could only be effected by a long lapse of time.

In all their descriptions of the ancient Irish dress, mention is made of the long Cota universally worn by them; this was a kind of shirt dyed yellow, open before, and falling below the waist, so far as to admit of being occasionally folded about the body, and made fast by a girdle round the middle; of some the sleeves were short, of others long, coming down to the wrist; even the custom of dyeing yellow, Spencer thinks, came
from

from the east: "it was devised, (says he), in those hot countries, where saffron is very common and in * rife, for avoiding that evil, which cometh of much sweating, and long wearing of linen." Lord Bacon assigns a more delicate, and perhaps as sound a reason for the *universal* use of linen shirts dyed with saffron among the Irish. "The Irish wear saffroned linen shirts, which continue long clean, and lengthen life; for, saffron being a great binder, oily, and hot without sharpness, is very comfortable to the skin".† ‡ But the late Countess of Moira thought, that the Irish rather dyed their linen with a species of moss, (lichen) than with saffron, which indeed is very probable, as they would have found a difficulty in obtaining it in the early ages, while navigation was in its infancy, and it does not appear that it grew here; and that the saffroned coloured linen, in which Cambden mentions that O'Neil and his followers were clad when they visited Elizabeth, was dyed with that kind of lichen, that grew upon rocks, and is prepared by the Irish in archil; and it resembles in the mass that shade of yellow, which borders on brown.

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* In prevalence.—† Bacon's essays, vol. 11. 449. ‡—Archæologia, and Walker's Essay on the dress of the ancient Irish. The researches of this illustrious female, which have appeared on this and other subjects, leave much to regret, that more from her pen has not met the public eye.

To these authorities, which are cited to prove a very ancient establishment of a linen fabric, I shall add others even of greater weight; for, in an act of Henry the 8th to prevent forestalling, linen and yarn are particularly specified, and the Irish mentioned as exporters of them for an hundred years;* and, in the reign of Elizabeth, another act was passed against laying flax and hemp in rivers to steep; this alone shews the great quantity of these materials, which must have been raised, even at a time when Ireland was in the midst of civil war, and torn by all those convulsions that follow such a state. Morryson also, who was secretary to Lord Mountjoy, observes, that Ireland yields much flax, which the inhabitants work into yarn, and export; and there is still extant another act restricting the higher orders from wearing an extravagant quantity of linen in their shirts. What has been said may suffice to shew the high antiquity of the linen manufacture in Ireland; for, of its introduction there are no further traces than what has been said in the first part of this section. I shall, therefore,

now

* In Madox's History of the Exchequer, the first notice is found of Irish linen in England, in 1272, Henry the 3d's reign, upon occasion of a quarrel between two thieves, who stole some of it at Winchester among other goods.—Macpherson's Annals of Commerce

now proceed to give a concise view of its progress since it became a great national object.

In the reign of Charles the 1st it attracted the attention of Lord Strafford, who adopted the most effectual measures for the encouragement of it; and, in 1673, Sir William Temple asserts that, if the spinning of flax was encouraged, we should soon beat the French and Dutch out of the market, though in that year England imported from France to the amount of 507,000*l.* including 2820 pair of old sheets. In 1678, by an act for the advancement of the linen trade of Ireland, this traffic was prohibited; but, in 1685, James the 2d was so much in the French interest, that he obtained a repeal of the prohibitory act. At the revolution, however, the importation of French linen was declared a nuisance by the parliaments of the three kingdoms, and finally suppressed.

In the year 1698, the jealousy of the English was excited to such a degree by the prosperity of the woollen manufacture in Ireland, that both houses of parliament addressed the king to discourage it, promising at the same time every encouragement to the linen trade. This stipulation was announced to the parliament of Ireland by the lords justices, in which both houses readily acquiesced; and the transaction has ever since
 •
 been

been considered by the Irish as a solemn compact between the two countries; but the circumstance, which operated more than any other to give that high degree of perfection to our fabrics, which they have attained since the commencement of the eighteenth century, arose from the repeal of the edict of Nantz, which drove so many protestants of all denominations from France, and amongst them many of the most industrious manufacturers in every branch of the linen trade from the northern provinces of that kingdom. Many of these people, from their attachment to William the third, were attracted to these kingdoms, as well as to avoid the evils that awaited them at home, and were encouraged to settle in Ireland by the measures, that had been taken in favour of the linen trade.* The principal of these was Mr. Lewis Cromelin, who obtained a patent for carrying on and improving the linen manufacture, accompanied with a grant of 800*l.* per annum as interest of 10,000*l.* to be advanced by him, as a capital for carrying on the same; 200*l.* per annum for his trouble; 120*l.* per annum for three assistants; and 60*l.* a year for the support of a French minister in the town of Lisburn, where many of them settled. Mr. Cromelin was a native of St. Quintin, where his ancestors had carried

* The act for their naturalization passed in 1708.

carried on this business with great success for many generations. In 1705, this gentleman, in a work written on this subject, successfully combated the prejudices, which prevailed against the culture of flax and the making of linen. It consisted of six chapters on the following subjects:—1st, preparing ground, sowing, weeding, pulling, watering, grassing flax; 2d, dressing the same; 3d, on hemp; 4th, spinning and spinning-wheels; 5th, preparing the yarn, and on looms; 6th, on bleaching.

Previous to Mr. Cromelin's time, no web finer than a fourteen-hundred* had been made in Ireland; but he imported a thousand looms from Holland, and spinning wheels on an improved construction, and had the happiness, before he died, of seeing his exertions for the improvement of this trade crowned with success. Though extraordinary as it may seem, linen was not exported free of duty until the fourth of Anne; but in the 9th of that reign an event took place, which is justly considered as of great importance in the history of this business. In that year was established a Board of trustees of the linen and hempen manufactures; and, on the sixth of October in the same year, the Duke of Ormond nominated an equal number of trustees for each province.

* That number of threads in the breadth of the web.

province. In the eighth year of George the 1st, 1500*l.* was granted to them to build a linen-hall in Dublin, for the more regular sale of white linen ; and in the tenth of the same reign 2,000*l.* was also granted for the encouragement of the growth of flax and hemp. It would be too minute for this report to enter into a detailed account of all the laws passed, and regulations entered into for the government of this important branch of our national industry, which since that period has rapidly increased, and is now become not only the staple of all the counties of Ulster, but has spread in one or other of its branches far to the west.

Previous to the year 1728, bleached linen was sold in fairs; the same person, who manufactured it, bleached it also. Public lappers had been appointed in 1719, to examine and measure all webs brought to them; for it was found inconvenient, when the manufacture extended, and brought buyers from Dublin and distant parts, to measure each piece on the afternoon of the fair day. These lappers were furnished with a statutable yard, and were obliged to put their names and places of abode, which was done with a seal on every web, as they were answerable for the quantity and quality. Since the separation of
manufacturing

manufacturing and bleaching, brown linen alone is sold in the markets and fairs; every web, that is exposed for sale, must be marked by a brown seal master, who gives security for the faithful discharge of his duty, and is intitled by law to one shilling per piece, after having measured and examined it. Inspectors are also appointed as well as seal masters by the Linen board; the duty of these inspectors is to see, that there is no fraudulent collusion between the former and the weaver, and to prevent forestalling, &c.

When this manufacture extended, bleaching became a separate business. The bleacher bought, or caused to be bought for him, the brown linen in the markets, as it came from the loom, bleaching as much as he could buy on his own account, and, if his machinery was capable of it, performing this operation for others, who did not possess that conveniency themselves. The old utensils were found totally inadequate to the rising trade; and extensive machinery, which of late years has undergone considerable improvements, now supplies their place.

In this age of chemistry, when the nature of bodies, so far as they affect other bodies, is so well understood, the art of using the materials, employed for whitening linen, must also be much improved;

improved; consequently a less portion of time is now taken up in obtaining that pure white, which it is the pride and profit of each bleacher to bring to market; and, upon the whole, this is now accomplished with fewer accidents, and more general safety, than in the infancy of the art. Since the establishment of the white linen-hall in Dublin, most of the linen, that is finished, is sent there, where drapers or factors are accommodated with rooms for exposing their goods to sale; or they are consigned to correspondents in different parts of England. The Dublin markets are regulated, in point of time, by the Bristol and Chester fairs; and a general assortment of linen is presented three times every year to buyers, who resort to Dublin from all parts of Great Britain.

About the year 1785 an attempt was made to remove the sale of white linen from Dublin to the manufacturing country; two halls were built by subscription, one at Belfast, the other at Newry. The latter has been diverted to other purposes; the former, although it does not rival Dublin, and has ceased to hold regular markets, possesses considerable trade, and is very serviceable in enabling merchants to assort cargoes for exportation.

Having

Having given this general sketch of the history of the linen trade of Ireland, I shall now lay before the reader the most authentic documents of its progress for more than a century to the present time; observing that what is here said respects the whole trade, and not that of any particular district. To treat of it locally would have been most difficult, and could not have answered the end in view, that of impressing the vast consequence of this staple manufacture to the general interests of the empire, and of shewing that, if it has been fostered by the hand of power, it has amply repaid every degree of partiality towards it; and that the wealth it brings in, and the numbers it maintains, form no small support to the great political body.

In the beginning of the reign of William the third, the value of linen exported was only to the amount of £6000.* Not quite twenty years after, it had increased to so great a degree, that in the year

1710	1,688,574	yards were sent abroad.
1720	2,437,984	
1730	4,136,203	
1740	6,627,771	
1750	11,200,771	
1760	13,375,456	These two years it had declined from
1761	12,048,881	what it was in 1759.
1762	15,550,676	
1763	16,013,105	
1764	15,101,085	
1765	14,355,205	
1766	17,892,102	
1767	20,148,170	
1768	18,490,019	
1769	17,796,705	
1770	20,560,750	
1771	23,376,808	
1772	20,599,178	
1773	18,551,700	
1774	16,916,674	
1775	22,502,000	
1776	20,502,587	

* *Morphyerson's Annals of Commerce.*

OF THE COUNTY OF ANTRIM. 387

Year. Yds. Linen exported.

1777	19,714,638	So far as 1778, I have extracted from
1778	21,945,729	Macpherson's <i>Annals of Commerce</i> , who
1779	<i>I have no return for these</i>	observes that, by the bounty on exportation of Irish linens from England, the
1780	<i>two years.</i>	exportation increased from 40,907 yards,
1781	March 25. 14,947,265	which it was in 1743, to 3,450,224 yards,
1782	24,970,303	which it was in 1771. For the first sixty
1783	16,039,705	years, the amount is given only every ten
1784	24,961,893	years.
1785	26,677,647	What follows, from 1778 to the present
1786	28,168,666	year, I owe to the attention of Mr. Corry
1787	30,728,728	of the Linen Board, who applied for it
1788	35,487,691	to the Inspector General of Exports,
1789	29,344,633	through whose Office I have been furnished with it, with the greatest liberality.
1790	37,322,125	
1791	39,718,706	
1792	45,581,667	
1793	43,312,657	
1794	43,259,764	
1795	42,780,340	

	<i>Yards.</i>	<i>Value,</i>	<i>Total value.</i>	
		<i>per yd.</i>		
		<i>s. d. £.</i>		
1796	46,705,319	1 7	3,697,503	From 1781, to this
1797	36,559,746	1 5½	2,665,814	time, all the linen was
1798	33,497,171	1 5½	2,442,469	computed at 1s. 4d.
1799	38,466,289	1 5½	2,804,833	per yard; since this
1800	35,676,908	1 7	2,824,421	date the <i>real</i> value
From March 25,				has been put on them,
1800, to 5 Jan.				and returned to the
1801	25,011,516	1 7	1,982,473	Inspector General.

One

	<i>Yards.</i>	<i>Value per yd.</i>	<i>Total value.</i>	
<i>One year to Jan. 5</i>			<i>£.</i>	
1802	37,767,077	2 0	3,779,707	
1803	35,491,131	2 0	3,549,113	
1804	37,432,365	<i>no value given.</i>		
1805	42,988,621	2 0	4,298,862	
1806	43,534,971	1 11	4,172,101	
1807	39,049,727	2 4	4,555,801	
1808	40,901,442	2 4	4,771,834	
1809	43,904,382	2 8	5,853,917	
1810	37,061,859	2 6	4,632,732	<i>Of the quantity made in the year 1810, 165,400 pieces were bleached in the County of Antrim, or finished brown; value 239,820<i>l</i>.—County In- spectors's Report, given by Mr. Corry.</i>
1811	36,846,971	2 4½	4,375,577	

As the general average here given may appear small, it is necessary to observe, that a considerable quantity of coarse linen is exported, and much of it as it comes from the loom; consequently it, from its cheapness, keeps down very much the price of the whole.

In this account of the progress of the linen trade, from the beginning of the last century, it appears to have made regular and steady advances, until the check it received during the war with America; from that time it declined until peace was established, when it once more revived, and seems to have been at its greatest height from 1792 to 1796; from this period there was a great falling off, which must be attributed to the cotton business then established, which employed so many hands formerly attached to the weaving of linen. From 1796 to 1804, it appears to have been very steady as to quantity, though much advanced in price. In 1805, there was an increase of exportation in yards of above five millions and a half, owing, probably, to the return of so many linen-weavers to their former business; and in 1809, though the average price was higher than ever known before, the quantity exported was nearly equal to what it was in 1796; at that time the cotton trade received such a shock, that it became necessary for those concerned in it to discharge the greatest portion of their workmen, who of course, from necessity, were obliged once more to return to the old established fabric. In the years ending in 1810 and 1811, there has been a considerable
falling

falling off, probably owing in part to the high price of flax, and to the restoration of the cotton trade in a certain degree, but more to the unsettled state of politics.

From this short survey, some pleasing reflections must arise upon the general steadiness of this manufacture, which, though subject to fluctuations, has never at any time been so far reduced as to be threatened with a total overthrow. This may be attributed to many causes; those, which appear most obvious, are the general and necessary demand for the article itself, and the difficulty of transplanting a trade, which, from its nature, requires such a multitude of hands; for every trial yet made in this inventive age, to spin flax into fine yarn by machinery, has hitherto proved abortive.

The varieties of our linen fabrics are cambrics,* some of them made to a great degree of fineness and perfection, so as to equal the best foreign; tickens; broad and narrow sheeting; twilled and plain chequer, with a number of coarser articles.

To

* Cloth of this description, under five shillings per yard, is called lawn; above that price, cambric. The great markets for this are Lisburn and Lurgan. In that neighbourhood cambric has been made, that sold for 1*l.* 2*s.* 9*d.* per yard, unbleached. In the exports of linen cambrics are included.

To these must be added, damask, damask-diaper, and diaper;—these require particular notice. It appears from the Transactions of the Linen Board, that these manufactures were general in the north of Ireland before 1712. In 1728, Mr. James Bradshaw presented a paper to the Linen Board, for the advancement of the diaper trade, and the committee sent him to Holland and Hamburgh, to inform himself of the method of making diapers. In consequence of Mr. Bradshaw's observations, the trustees appointed him to provide all materials necessary, and to carry on the business after the Dutch method. In 1790, John Holden was appointed to try experiments relative to his inventions in the manufacture of diapers; a loom and money were provided for him to carry on the work. But the introduction of the manufacture of damask, on an extensive scale, and in a degree of perfection hitherto unequalled, was reserved for the late Mr. William Coulson, father of the present proprietors of the manufactory, who established it at Lisburn, in the year 1766, where this beautiful branch of the linen business is now carried on by Messrs. John and William Coulson, who, by their attention, have brought it to vie with any thing of the kind in Europe. Foreign courts,

as well as that of St. James's, have been supplied with table-linen from their manufactory.

The machinery of the looms, on which this cloth is wrought, (some of which are furnished with five thousand sets of pullies) is of so complicated a nature as to preclude the possibility of giving such a description, as could convey an adequately clear idea to a person, that has never seen it, and of the method made use of to shew a pattern or picture upon a ground, where both ground and pattern are equally colourless;—yet, though the weft and the warp are alike white, the pattern, when worked into cloth, assumes quite a different degree of shade from that of the rest of the web. The patterns are extensive and varied. Rich centre-pieces are in many of the cloths ornamented with borders of fruit and flowers; coats of arms, crests, and mottoes are introduced into others.

These cloths are made of yarn, of different degrees of fineness, so high as to fifteen hanks in the pound, and are from $1\frac{1}{2}$ to $3\frac{1}{4}$ yards wide; some have been made so long as 20 yards. The napkins are from $\frac{1}{2}$ to $\frac{3}{4}$ wide, and are, as well as the lay-overs and slips, of correspondent patterns with the cloths, and, when made to suit those with arms, have generally a crest or cypher inserted on
each

each. Some of these patterns are so extensive, as to require from four to sixteen persons to attend the loom, in which they are produced.

There is a newly invented draw-loom, in which the pattern is worked without an assistant;* it is used for the more common kinds of table-linen, but is not much approved of, and is entirely confined to the limited and common patterns. In the manufactory at home about fifty looms are employed for damask, and damask-diaper, which require about two hundred hands.

Diaper is mostly wove by the journeymen at home, and some damask-diaper also. Besides what is made for this establishment, there is a great deal manufactured in the country, both by those who employ weavers, and by weavers upon their own account; but this establishment alone employs, in and out of the factory, about two hundred and fifty looms, giving employment, one with the other, to two hands each, making the whole number about five hundred.

The earnings in this trade are but small in the beginning; the apprentices have from four to six shillings per week; finished workmen have earned so high as thirty shillings per week; but, between

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this

* Called a *draw-boy*.—For this statement I am indebted to the attention of Mr. Walter Coulson, of the house of Coulson, Lieburn.

this and the first-mentioned sums; the gradations are various according to skill and diligence. Where the workman weaves upon his own account; his profit depends not only on his own exertions, but on his skill, or good-fortune in purchasing his material. If the yarn is laid in cheap, the profit of that is added to the work; if dear, it is often a diminution of it;—so it is in every branch of the linen trade, where the weaver is the proprietor of his yarn, which is either bought, or spun in his own family. When the yarn belongs to another, he is then paid a fixed price for weaving the web; his earnings are then certain, and depend entirely upon himself, as there are stated wages for every degree of fineness, by the yard or piece. Without entering into the particulars of each web, of a different degree of fineness, the weekly earning of a good linen-weaver, who works for an employer, may average about seven, and sometimes eight shillings. Inferior workmen do not make within one third of that sum. Many weavers have small farms, and only employ themselves in this way during the intervals of their farming occupations. Many of them are the sons of farmers, who assist in the work of the land, and then return to the loom; and most of those, who follow this trade, and live in the country, have gardens and ground
allowed

allowed for setting potatoes; so that few are without some addition to their ostensible calling.— These people, thus living dispersed in the country, are, in general, of a better description than those who live in towns; they are more out of the way of temptation and of bad example.

Linen Yarn.

The spinning of flax being more extensively diffused than even the weaving of linen, and much more being produced than can be employed in that way, the surplus yarn has hitherto been exported in large quantities to England and to Scotland. This demand has proved a great resource, not only to the spinners of the north of Ireland, by keeping up the price, but to those in the west, where yarn is made in large quantities, and where there are not hands to weave it. For some years past, however, this business has been much on the decline, and of late has been nearly as low as in the beginning of the last century. This is attributed to the want of demand, in the first instance, from the west of England, where such quantities were used in the stronger cotton branches, which are now made entirely of cotton. The exportation to Scotland still continues,

but

but is not so great, though much of it is used in the making of thread. But what I understand has given the great stroke, is the taking off the duties on the importation of foreign yarn to England. With what good policy that has been done, I will not presume to say; but certainly this branch has suffered much by it.

To this I shall subjoin an account of the numbers of *cwts.* taken from 1710, up to January, 1811, at different periods, which will shew the matter at one view :

<i>Year.</i>	<i>Cwts.</i>	<i>Year.</i>	<i>Cwts.</i>
1710	7,975	1764	31,715
1720	15,122	1765	26,127
1730	10,088	1766	35,018
1740	18,542	1767	30,274
1750	22,373	1768	32,590
1760	31,842	1769	37,037
1761	39,699	1770	33,417
1762	35,950	1771	34,166
1763	34,468		

So far I have taken from Macpherson's History of Commerce, who goes no lower down. What follows, is from the Inspector-General's Office, to this year, from 1802.

Year.

<i>Year.</i>	<i>Cwts.</i>	<i>Year.</i>	<i>Cwts.</i>
1802	22,492	1807	8,705
1803	9,315	1808	12,443
1804	7,847	1809	25,392
1805	8,967	1810	13,701
1806	7,075	1811	6,049

Ending 5th Jan. 1811.

A calculation, tolerably accurate, may be made of the numbers annually employed in weaving for exportation, by ascertaining the number of yards of linen, which a weaver, on an average, can work in the course of a year. For this purpose I shall calculate upon a seventeen-hundred web, which is about the medium fineness; of these, a tolerably good workman can weave one of twenty-five yards in length every three weeks, provided he meets with no interruption; this would be seventeen in the year, or four hundred and twenty-five yards, allowing one week for recreation, or other avocations. But, as the majority of linen-weavers have some other calling, which takes a part of their time from the trade, and, as many of them only work occasionally on it, from the best information I can say, that more than the fourth of the quantity of yards may be deducted from what is stated above

above as a full year's work, which leaves twelve webs, or about 316 yards, to found the calculation upon. Taking, therefore, the average exportation of yards for the last seven years, which is found to be 40,612,567, and dividing it by 316 yards, the average annual weaving of one man, it will give nearly the number annually employed in the supply of the export of linen, which by this process is found to be 128,584.

The number of weavers being ascertained, it will not be difficult to ascertain the proportion of spinners necessary to keep them supplied with yarn; for this purpose recourse must be had to the quantity of yarn consumed by a weaver of linen in the year, and to that produced by a spinner in the same time. A web of seventeen-hundred threads in breadth, and twenty-five yards in length, such as has already been mentioned, requires fifty-four hanks of yarn, of four hanks to the pound. Twelve of these webs (the work of a year) will therefore require 648 hanks. Now a common-rate spinner can in a week make five hanks of yarn of that fineness (which is the regulated quantity); this in a year is 260; the proportion, therefore, between 648 hanks, the consumption of the weaver, and 260 the produce of the spinner, being nearly as five to two, gives
two

two and a half spinners to one weaver; the total of weavers then being 128,584, that of spinners must be 321,460. In this account of the trade, nothing is said of the weavers and spinners employed in the home consumption; what that is I cannot take upon me even to form a conjecture. But to supply a country which contains more than four millions of inhabitants, all of whom wear linen more or less fine, with this necessary article of comfort and of dress, must require a great additional number of hands, that cannot here be brought forward, nor computed. The other occupations, which depend upon this, also require a great accession of numbers—the farmer for raising the material; the miller who scutches it; the hackler who dresses it; the bleacher; the lapper; the mill and wheel-wright; the carpenter; the manufacturer of soap, of vitriol, and of kelp—in fact every individual, from the highest to the lowest, in some degree affected by its influence.

Spinning of flax by machinery has been some time ago added to our manufactures; for certain kinds of fabrics the yarn produced in this way is well adapted; but they are of the coarser kinds. From the inequality of length and thickness in the raw material (arising from the mode in which it is collected, being the produce of such a variety of grounds)

grounds) the difficulty of making fine yarn in this way has not yet been overcome; what is made must, however, be good, as the flax would, in general, afford to be much finer spun than it is. There are two mills erected for this purpose, I am informed; one at Crumlin, by Mr. J. Ferguson, the other near Ballymena, by Mr. Joseph Bryan; what number of hands are employed I have not heard, nor their earnings.

Cotton.

" So early as the year 1777, on a tour through North Britain, the late Robert Joy conceived the scheme of introducing into this then desponding kingdom the more intricate branches of the cotton manufacture, which had proved unfailing sources of industry and opulence to the sister country. To this he was principally prompted by a desire to render service to the lower orders of the working poor, particularly linen-weavers and spinners, whose livelihoods are often rendered precarious, when a nation depends, as ours then did, almost solely on a single manufacture, sometimes as much depressed as at others prosperous." *

Having

* Extract from an account of the death of the late Mr. Robert Joy, Dublin Evening Post, April, 1785, when the general facts contained in this paper were recent.

Having, in conjunction with Thomas M'Cabe, suggested, that the spinning of cotton-yarn might, as an introductory step, be a fit and profitable employment for children in the Belfast Poor-house, several of them were accordingly set to work on the common wheel; but, the various machinery in England giving that country so great a superiority, it was found that no benefit could be gained without the introduction of it here.

A spinning machine was therefore made in Belfast, at *their* instance and expense, under the direction of N. Grimshaw, cotton and linen printer, from England, who had some time before settled in this country; and shortly after an experienced spinner was brought over by Mr. Joy from Scotland, to instruct the children in the house. Also under the same direction, and at the expense of the gentlemen mentioned, a carding machine was erected, to go by water, at Mr. Grimshaw's, which was afterwards removed to the Poor-house, and wrought by hand.

After, Messrs. Joy and M'Cabe had in vain solicited the co-operation and pecuniary aid of others, in prosecuting a scheme fraught with such national advantage, they proposed a transfer of their machinery at first cost to the managers of the charitable institution, promising as strict at-

tention to the success of the measure, as if the emolument was to be their own.

On the refusal of the committee to run the risk of a new undertaking, the original proprietors formed themselves into a company, with additional partners, under the firm of Joy, McCabe, and McCracken, and contracted with the same charitable institution for a number of its children, as well as for the use of their vacant rooms. They dispatched a skilful mechanic to England, who at personal risk, and considerable expense, procured a minute knowledge of the most improved British machinery, which the inventors and proprietors intended to have kept a secret both from this and foreign countries. On his return, they erected a new carding machine, of superior structure to the first imperfect one, and a spinning jenny of 72 spindles, then reckoned a large one, differing materially in its construction from the other.

In a memorial to the Dublin Society, praying for aid, from which the substance of this statement of facts is principally extracted, they informed the Board, that, so far from confining their hopes of gain to themselves, they had encouraged the public to avail itself of their discoveries. They had exposed their machinery to public view;

view; permitted numbers, even from distant parts, to be taught in their apartments, without any charge for such indulgence; and promoted the progress of the manufacture of cottons, dimities, and Marveilles quilting, equally by example and instruction.*

The magnitude of those improvements at the time is now to be estimated by comparison. Prior to this, from eight to ten cuts per day were the scanty produce of the most laborious spinner on the common wheel, while in the same time not more than a single pound could be carded by hand. On their jenny of 72 spindles, 72 Irish hanks were spun weekly, an increase of fourteen to one. These exertions were in time followed, on an enlarged scale, by Messrs. Nat. Wilson and Nicholas Grimshaw, both since deceased. To the talents, property, and adventurous spirit of the former of these two gentlemen, and to the practical knowledge, genius, and industry of the latter, this country stands very highly indebted.

The first mill for spinning twist by water in Ireland was built by them in the year 1784, from
which

* Whoever wishes to inquire farther into this subject is referred to the memorial itself, to the Dublin Society, and to minutes on the looks of the Belfast Charitable Society.

which date the Irish cotton manufactures were considered firmly established.

In the year 1800, only twenty-three years from the origin of the enterprize by Joy and M'Cabe, it appeared in evidence before parliament, that the cotton manufactures, which they had thus introduced, gave employment to 13,500 working people, and, including all manner of persons occupied in various ways, to twenty-seven thousand, within a circuit of only ten miles, but comprehending within its bounds the towns of Belfast and Lisburn.

It deserves remark, that, as far as machinery is concerned, a poor-house was the cradle of the cotton trade of Ireland; and that the detail now given should be a stimulus to the exertions of every individual, as it demonstrates how much may be effected by a limited capital and ardent zeal.

In the present instance, the early introduction of a manufacture, already of immense and increasing importance, has been traced to the perseverance of two members of society, actuated by a wish to create useful employment for unfortunate infants, to assist the working classes at a time, when the linen manufacture was in its most depressed state, and to render a permanent benefit to the community at large.

To

To the above interesting and authentic detail of the establishment of the cotton manufacture in the neighbourhood of Belfast, I shall add the present state of the business as furnished to me by Mr. John M'Cracken. It appears, by the weekly lists of imports and exports of the port of Belfast, that, for the year ending 1811, there were imported 14,320 bags of cotton wool, of which were exported 3,007, leaving for home consumption 11,313 bags, which, at 20*l*. per bag, comes to 226,260*l*., which raw material, when manufactured, is estimated at one million sterling.

Since the union, the number of steam-engines, erected in a circuit of about ten miles around Belfast, is 15, equal to 212 horse power, driving 99,000 spindles; the cost of these works above 120,000*l*; besides these there are six factories, the machinery of which is wrought by horses, or by hand, and twelve spinning-mills driven by water, containing above 50,000 spindles, so that the total may be stated at 150,000 spindles. Mr. M'Cracken's mill, containing 14,000 spindles, employs 200 persons within the walls, so that, according to this proportion, the whole number of spindles may be computed to employ near 22,000 persons in the first instance.

The

The gross wages of a spinner are 2*l.* 7*s.* per week; out of this three children are to be paid from three to six shillings per week; say the whole 13*s.* which leaves to a good journeyman 1*l.* 14*s.* set wages per week. Each spindle is capable of spinning one and a half hank per day, which make, for 160,000 spindles, 225,000 hanks; the number of working days being 313 in the year, the total number of hanks spun in that period are 70,425,000.

Calculating therefore upon 70 millions of hanks or skeins of yarn, each skein consisting of 80 threads, and 18 of these taken as a spangle; the average number of weavers, necessary in one year to work up this quantity of yarn spun in the same time is found to be nearly eleven thousand; 6361 skeins being equal to the work of one weaver for that period, as extracted from the books of a considerable muslin manufacturer in the town of Belfast. In addition to this, the quantity of imported yarn must be taken into consideration, which may come to one-half of what is spun at home, which will make the total number of those, employed in weaving, sixteen thousand five hundred. If to these again are added the attendants upon the looms, who, taken at a low calculation, are as one to two looms, the numbers will be nearly
twenty-five

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twenty-five thousand; and the total number is, upon the best grounds, asserted to be increased, at least one-fifth more, by those who are occupied, as already mentioned in the spinning department, in bleaching, embroidering, making of looms, reeds, and a long stoetere of other trades, which depend upon it, besides the artists and persons of different descriptions, who are engaged in the calico printing business, which is so extensively carried on at the different greens.* Upon these data it is assumed, that not less than 30,000 individuals derive a good support from the muslin and calico branches of this trade, taking in all the different departments.

The machinery of Mr. McCracken's cotton-works requires 600 tons of coals per annum, in which proportion, in the circuit of ten miles round Belfast, 6000 tons are required for one year's consumption. This employs ten vessels, of 100 tons, in the coal trade, the coals averaging about twenty-five shillings per ton. Before the erection of machinery all the cotton-yarn, used in the different fabrics, was imported; and, though there is still an
importation,

* These greens belong to Messrs. Grimshaw, Aarrow, Stanton and Co. English and Sinclair, and Stewart Dunn. The beauty and variety of their patterns, &c. are too well known to require a panegyric here.

importation, the advantage must be great indeed, when it is less by seventy millions and a half of hanks, which gives employment in this branch alone (as is seen above) to such a number of persons, merely on this one operation, besides the activity imparted to the many trades, that are connected with it, which, until lately, was lost to this country.

The yarn, thus produced, is made into all the varieties of cotton goods, that are required for the consumption of the country, ALL of which, until the introduction of this branch of industry, were imported. The home consumption is in itself so great, that, to supply it, a most important object is gained, were we never to go farther; and it is the most sure market, though probably not the most extensive;* and certainly this business has answered the end of giving to the industrious inhabitants of this and the neighbouring counties a second source of support, of which they have fortunately availed themselves.

From this general and concise view of the present state of the cotton trade, compared with its humble beginning, we cannot avoid being struck with the rapid progress it has made within little
more

* In 1810, muslin, to the amount of 6050*l.* cottons and cotton-yarn have been exported from Belfast, amounting to 30,578*l.*

more than thirty years (from the time the idea was first adopted by the benevolent mind of him, who was the primary mover in this matter) in a county, where it was hitherto nearly unknown. But from a country used to habits of industry, where the spinning-wheel is in the hands of every female, and the shuttle in those of most of the males, every thing may be expected, when an object is offered of sufficient importance to call out its exertions. Thus it was in the latter end of the 17th, and beginning of the 18th centuries; the great body of the inhabitants of the north of Ireland, industrious even at that day, as soon as encouragement was given to the linen trade, saw, and seized the opportunity with avidity, and made a progress, not inferior (the times considered) to what the cotton has done of late, and nearly in the same space of time, and which has laid the foundation of the present prosperity, which their descendants enjoy.

Many objections have been made to the cotton business, from the idea of its injuring our staple manufacture; but this idea does not appear to be just; though taking hands from it makes the supply for exportation smaller, that supply is more easily disposed of; and those hands, thus employed, give us at home what we should otherwise be

obliged to seek for abroad ;—and as to its spoiling the linen-weavers, by using them to a lighter kind of work, in case they should be entirely bred to the cotton at the beginning, and afterwards have recourse to the other, for want of employment in it, certainly it is not more difficult for a man, who knows how to weave cotton well, to learn to weave linen well, than for a person who has never learned either. It seems to me, that these trades naturally assist each other ; and that, in a stagnation of either, the prosperous one can always help that, which for the time is not so much so. There are in all manufacturing countries calamitous times, which may be foreseen, but cannot be guarded against, and which probably arise from overdoing any particular branch. What remedy could be proposed for this, I am at a loss to know ; for, whilst the employer and employed find their advantage, they will go on.

The remarkable depression of the linen trade during the American war, of near five millions of yards, shewed that even our staple manufacture was not free from fluctuation ; and the fluctuation of the cotton trade in 1809, is another proof of the temporary instability of such things ; for in that year, in Belfast, and the country round, two thousand calico looms were struck idle, in five weeks,

weeks, during the months of March and April. The usual produce of these looms was two thousand pieces every week, of forty yards in length, which wrought up fifty bales of raw cotton, of 240*lb.* each, averaging 12,000 pounds weight. On such distressing subjects as these, to which every commercial and manufacturing country is subject, the reader must be left to his own reflections.

From the high wages given in the first establishment of the cotton, there has been a general rise in other branches, something having been added to the price of weaving linen also. The wages of cotton-weavers are now a little reduced, but still sufficiently high, to enable a good workman, with good yarn, to make from twelve to fifteen shillings per week, if he was to work without interruption; but time is consumed in going to ware-rooms for yarn, in putting in the webs, &c. so that it does not, upon the whole, come to so much.

In addition to the weaving of muslins, ginghams, and calicoes, there are many other varieties of the cotton business carried on. About 300 persons are employed in the various kinds of cords and fustians, &c. all of which, until of late, were imported. Their earnings are, in this branch, from nine to fifteen shillings per week, in the weaving, cutting,
and

and dyeing.—A considerable quantity of cotton-chequer is also made, which, from its cheapness, has encroached much on the linen article of this name so much used formerly.

Canvas manufacture.

This manufacture was established in Belfast by the old Rope-walk company, in 1784, with six looms. At that time there was a bounty upon the importation of canvas from England, and no duty in Ireland; and on England we were dependant for every yard, that was required; the bounty has since been taken off in England.

At this time there are two factories for this article in Belfast, that employ above twenty long-shed wheels, and thirty looms. There is also at Larne one factory of six looms, and four long-shed wheels. These looms will give employment to, at least, 300 female spinners. The earnings are good in this trade, from twenty-one to seven shillings per week.

Rope-making.

This business was established about sixty years ago; before that time all cordage was imported from England. The consumption of Russian

ian hemp in Belfast is about two hundred tons per annum, and gives employment to one hundred people in the different rope-walks. Their earnings are from three shillings per week to one guinea.

Paper.

The manufacture of paper was first introduced, in the county of Antrim, at Dunmurry by a person of the name of M'Manus, who had for some time resided in France; this was the primary establishment in the province of Ulster, in which there are now sixteen paper-mills, seven of which are in the county of Antrim. The first attempt to make paper was very imperfect in this county, being only of the most inferior kinds, and the rags were reduced to pulp, in a very insufficient manner, in mortars by what was called a hammer mill.* One of the earliest engines, that was erected, was by a Scotchman, William Bell, who had been brought from Scotland by Messrs. James and Daniel Blow, for the purpose of improving

* In 1749, there was a parliamentary grant to Francis Joy, of 200l. as a reward for his improvements in the paper manufacture in the north of Ireland. He introduced the first paper engine into Ulster.

proving the machinery in their paper-mills near Belfast. Papers of different kinds are now made, and, in some of the mills, of the best quality. The number of persons employed varies, according as they are engaged in making brown or white papers. In the mill of Messrs. Blow, Ward, and company there are sixty persons at work. Ten manufactories of paper have at different periods been erected in this county; of these, only seven are now employed; not that the business is decreasing, for, since the mill at Cromac was built, four have been added; that at Lambeg, long since erected by Mr. Wolfenden, lasted but a short time. It is to be hoped, that at no very distant time we shall, by proper attention, be able to supply our own demand with papers of the best qualities. In this populous county there must always be a great supply of materials, which, though increased in price, must be manufactured much cheaper at home, than when sent abroad and returned to us, though we still send rags abroad.†

Woollen

† Would it not be worth trial, whether the refuse of the flax-mills could be worked into a pulp, first separating it from the stalks?

Woollen.

The only branch of this business, carried on in the county of Antrim to any degree of perfection, is the making of blankets, which has been established at Lambeg by the Wolfenden family, who settled in this country about two hundred years ago, and are well known for the excellence of their manufacture; every article in that line is made with a lightness and warmth equal to the best English goods of the same kind. This county not growing much wool, it is purchased at a distance, prepared and wrought up, at his own place, into blankets of various sizes and prices, from three quarters wide to fourteen quarters, and from eighteen shillings to six guineas per pair.

Some coarse woollens are also made by the farmers, for their own use. The wool is spun at home, the weaving done by persons bred to the business, who are paid by the piece or yard. In the Lower glens a woollen cloth is made, very strong and thick, which is a most comfortable kind of outside cloathing, as, from its thickness and texture, it is capable of resisting wet for a considerable time, and is remarkably well calculated

lated for that district, which is both mountainous, and exposed to the penetrating blasts of the sea-coast.

Stockings are wove in the different towns. In Belfast about two hundred persons are employed; but the finer kinds are imported. The earnings in this trade are from nine to sixteen shillings per week.

Salt.

Common salt is made in large quantities at Belfast, at Larne, and in most of the little ports on the coast. The process is carried on in the usual way of boiling the salt rock, which is imported, in sea-water. In some cases the salt-pans have lime-kilns situated under them, the same fire thus carrying on the two operations.

Soap and Candles,

it appears by the list of Exports, are made for sending abroad. In the year 1810, to the amount of £6478 of the former, and £3344 of the latter, was exported.

Potriol.

Vitriol.

A manufacture of oil of vitriol has been long carried on near Lisburn; it was first established by Mr. Gregg, of Belfast, but is now possessed by Dr. Crawford, of Lisburn. In this bleaching country there is a great demand for this material, which is found, when managed with judgment, to be the safest acid. Bleaching salts (oxigenated muriatic acid) are made in this laboratory, marine acid, and aquafortis sometimes, and Glauber salts in large quantities. The sulphur for this manufacture is imported from Sicily, the salt-petre from the sales of the East India company; of the former about 240 tons are used annually, of the latter about 25. The metals, lead, and iron, that are employed, as well as the glass, in which the operation of making is performed, and that required to contain it, is a heavy expense in the business, which requires from 400 to 500 tons of coals in the year, at the price of 30s. per ton at least. The general number of hands employed is about thirty; their earnings from seven shillings to a guinea per week. There is also another manufacture of vitriol near Belfast; but still there

is not a sufficient quantity made to prevent importation.

In Belfast, the cabinet-making business is carried on very extensively, and brought to a considerable degree of perfection. In other towns this branch is likewise established; and the making of all the improved instruments of agriculture has been rapidly progressive within the last ten years; for it is not more than that space of time, since every thing in that line was imported. In a former part of this work, a manufacture of this sort was mentioned at Lisburn; it must now be added, that several likewise exist at Belfast.

Leather.

A great falling off in this business has taken place of late years; there was scarcely a town, in which one or more tan-yards were not employed; and our leather, especially that tanned in Belfast, was much esteemed, and a considerable quantity exported. The Baltic trade was the best, but that being now nearly shut against us has reduced this manufacture, it is said, above one-third. Belfast now makes less than it formerly did, by near 2000-hides, and the other places are proportionally diminished

minished. But, when leather is cheaper here than in England, some is sent there. The interruption in this trade is unfortunate ; for great attention had been paid to its improvement, and a great progress had been made ; calf-skins are well prepared in all ways, both for shoes and boot-legs ; and, notwithstanding the high price of bark, the business was in a progressive state.

If the cultivation of the willow tribe, whose bark contains so much of the principle of tanning was attended to, a considerable change might be brought about in a few years in this business, to which the dearness of the bark forms so strong an obstacle ; our hides are certainly not inferior to those of any country ; all we want therefore is the material necessary to convert them into leather ; and there is not any plant, which can be brought so speedily to profit that way as the sallow ; but it would be necessary for some scientific person to ascertain that species, which affords what is best fitted for the purpose ; after that was done, encouragement might be given for propagating the plant, and, as the return of profit in the crop itself would not be very distant, good effects would probably be the result.

Casting

Casting of Iron.

This business has been for a number of years established at Belfast; but of late it has been improved, and carried on with great spirit. In the Lagan foundery, and in another on the same side of the river; joined to that in Donegall-street, there are about ninety persons engaged at these manufactories; besides all the usual and common utensils that are made, a great variety of machinery is cast and finished; and, by the skill and ingenuity of the fabricators, cast-iron is now substituted in many instances for wood. As it is curious to observe the progress of improvement, and the changes that occur in one business, from the obstacles which arise in another, I shall mention some of the most material articles, that are now formed of iron, which were (whilst wood was cheap, and the iron trade not so far advanced as it is) thought incapable of being made of the latter. In the first place water-wheels, as well as others, for mills, are made of this metal in all their parts, which are found as easy to be worked as those made of wood; and, though the first cost may be more than when made of that material, their superior duration makes them in the end much

much more desirable; and in another instance they have a great advantage, that, in case of accidents, the metal may be cast again; whereas a wooden wheel once damaged is useless. Also car-wheels, and barrow-wheels, the former made open, and turning on the axletree nearly as light as when made of wood, and shod with iron; to these may be added spouts for the eaves of houses, of any dimensions, which are a continual source of expense when made of wood; and ridge-tiles, not so heavy as stone used for the same purpose. All kinds of roofing may be added, and wall-plates to receive the same; besides window-sashes and door-cases, hot-bed frames, kiln-tiles and bearers, with numerous other articles.

At the Lagan foundery, there is now fitting up a steam-engine made there; and the grates, stoves, and chimney-pieces are well and neatly finished. To enumerate all would be unnecessary; it is sufficient to add, that every pattern given can be executed, even of the most complicated kind. The price of manufactured goods is from sixteen shillings per hundred weight to forty, according to the difficulty, filing and dressing forming separate charges.

The earnings in the trade are in the beginning small, not more than three or four shillings per week;

week; but, as those engaged increase in skill, their wages are increased, some having 6s. 8d. per day, and the very best 40s. per week. Upon the whole this seems to be a prosperous business, as, within a year, the foundery in Donegall-street has been erected, and there seems to be sufficient business for the whole. A very heavy expense in this establishment is the quantity of coals used, the amount of which, at the Lagan foundery, is about four hundred tons per annum.

Glass.

Many years ago a manufacture of window-glass and bottles was on foot at Ballymacaret (which may be considered part of Belfast); it has been for some time laid aside; but the making of flint-glass is still carried on in that place, by Mr. Edwards, and one has been erected in Belfast, on Peter's-hill; every thing in this line of business is executed in these houses, but not in sufficient quantities to prevent importation. The number employed at the former is about thirty, in all branches; in the latter about twenty-five. The apprentices earn from five to six shillings per week, finished workmen as much per day.

Turning

Turning and Fluting of Iron.

A manufactory for this purpose has been set up lately near Lisburn for turning rollers, spindles, and bobbins for cotton and other kinds of machinery; the lathes are moved by water; the work performed in other particulars, as in the usual mode of turning. All kinds of axletrees can be made, and other heavy work can be performed by the same process, in a more complete manner, and in a much shorter time than by the forge. Crane chains, and other work of that nature, are also manufactured at the same place; the manufacturer, name G. Hodson, a native of Yorkshire, but just from Birmingham; he has already about ten hands engaged in this business, who earn from three to seven shillings per day. This, I believe, is the first establishment of the sort in the kingdom, and appears to be one of the most ingenious inventions of modern times for the abridgment of labour, the forge and hammer being only necessary in the first instance, and the labour of the file being scarcely required, from the accuracy with which the work is done, and the polish given both by the chizel
used

used in turning, and by the instrument applied to making the flutes or grooves.

Potteries.

There has been a very ancient establishment of this kind at Lambeg, and one near the Maze, but they have never made any great progress towards improvement, being confined to the coarser wares; at Ballycastle a manufacture has been set on foot, which, though in its infancy, promises to do well; and all kinds of common crockery-ware are now procured at that place, at the Liverpool prices. The clay is found equal to any in England.—On this subject remarks have been made before.

Kelp.

Along the northern coast a considerable quantity of kelp is manufactured; the purest and best is that from the rocky shore of the Giants Causeway, and on the north side of the island of Rathlin (Raghery). In those places the wrack is free from sand, with which all other parts of the coast abound; this, by adhering to the sea-weed, renders the kelp of an inferior quality. In some cases

the manufacturers are suspected of mixing it with the weed to increase the weight. In Rathlin the quantity made is so great, that the rents are paid by it. That in quality superior is formed from weeds cut from the rocks, at a considerable depth, which afford a good crop every second year. The sort produced from what is thrown on shore is not so good. May is the best time for making this substance. It is generally cut and carried by women, who with creels, (a kind of basket fastened on the back) bring as much out of the sea in a day, as will make two hundred weight; if a horse can be employed, double that quantity will be obtained. When spread and dried, six or eight days of favourable weather will fit it for burning. It is computed that a ton of kelp can be manufactured, provided the wrack is furnished, and a field to spread it on, for about forty shillings or two guineas. It is frequently made by giving two-thirds of the quantity manufactured; the proprietor receives the other third. The greatest part of the kelp, made on the northern coast, is sold at Coleraine;—the price varies from six to fifteen shillings per hundred weight, of 120lb. Kelp is also made on different parts of the coast as well as at the port mentioned; but in what quantity I have not learned.

Scythe-stones.

At Ballycastle there is a considerable business carried on in making scythe-stones, the sand-stone there being particularly adapted for the purpose. They are dispersed over the neighbouring counties, and are sold by the dozen; all the hardware shops, and many others, where scythes are sold, retail them—the price in that way is about four-pence a piece.

To the foregoing catalogue of manufactures, which the county of Antrim affords, might be added, probably with propriety, several others, as those made of leather for home consumption, and sometimes for exportation; as at different periods considerable quantities of shoes have been sent abroad, with saddles and various other articles; but sufficient has been said to shew the highly respectable situation it holds, in common with the neighbouring counties, in the scale of industry and enterprize, and how various are the modes, by which those, who are endowed with those qualities, may maintain themselves, or improve their condition of life.

Commerce, which is founded on the interchange of the production of different countries, depends

so much on manufactures, that its natural place would be to follow them; but, the commerce of this county being so intimately connected with the town of Belfast, what is to be said on that subject must be reserved until that town, which merits such particular consideration, comes to be spoken of.

SECT. 6. *Fairs and Markets.*

In a country, where the population is so great, and where, from its manufactures, there must naturally be such an exchange of different articles, fairs and markets must be much frequented; consequently fairs are held in all the towns at stated times, and in many places, where there are no towns, a few houses alone affording refreshment to those, who resort to them; and in some cases tents are erected for this purpose. In all these fairs cattle, horses, sheep, and swine are to be disposed of; in many of them cloth and yarn, with a variety of other things, as hawkers and pedlars, travelling about the country, make their arrangements so as to attend there. On some of the great horse fairs, dealers from England, Scotland, and Dublin, are regular attendants, and circulate a great deal of money; horses of $\frac{1}{2}$ very good description are brought

brought to them; the most celebrated are Ballyclare, Mount-hill, Holestone, &c. The fairs of Belfast and Lisburn are very large, horses, black cattle, swine, sheep and lambs, in the season, being sent from considerable distances; though for the first they have not the same character as those already mentioned. To the fairs come numbers of people for amusement from the vicinity, whose dress and appearance strongly indicate the prosperity of the country; and the increased civilization of it is shewn by the absence of those riotous tumults, which formerly disgraced them.

The markets are either weekly or monthly; in these the disposal of linen and yarn are the principal objects, but many other things are also disposed of; and in all the towns of tolerable magnitude butcher's meat, fowl, eggs, &c. are sold, besides oatmeal and potatoes. Butter markets have been lately established in Ballymoney, Ballymena, and Broughshane, where it is disposed of in casks for exportation to buyers, who attend, and who take it to Belfast, there to sell it on their own account.

This arrangement is a great convenience to those little farmers, who, having but one or two casks to dispose of are well satisfied, that a profit should accrue to those, who save them the trouble

trouble and expence of travelling many miles for a small object. On this subject it is sufficient to add, that these markets are supplied with every article, for which there is a regular demand, dealers having sufficient sagacity to find out where their goods are likely to be advantageously disposed of.

SECT. 7. *Population.*

As the inhabitants of the county of Antrim are sprung from different sources, and still preserve the characteristics of those, from whom they have derived their origin (though among themselves few traces of their history now remain) I shall mention, in as few words as possible, the different races, to whom we owe our present population. The ancient Irish, the possessors of the soil, who inhabited the coast, appear to have had a very early intercourse with the Scots, who inhabited the opposite shores, as well as with the islanders that were subjects to the Lords of the Isles,* who were nearly independent of the kings of Scotland until the reign of James I. The distance between the two countries

* Their title was Earl of Ross; they were Lords of the Western isles.

countries was so small, that only part of a day was necessary for the passage, and, under favourable circumstances, their return was often accomplished in twenty-four hours. The consequences of this intercourse were frequent quarrels, &c. alliances by intermarriages and otherwise, and the settlement of many Scotch on the Irish ground. By one of these intermarriages with the Irish family of M'Quillan,* a M'Donald, or M'Donnell, descended from one branch of the Lords of the Isles, gained a footing in the northern parts of the county, and at length established himself, by the powerful aid he received from his country, over a tract of many miles in extent, though not without a considerable struggle, in which the natives suffered severely, and in the end transported themselves, with their chief, to other parts, near Lough Neagh and the Bann, and left the Scots possessors of the soil. In the last resort, however, M'Quillan appealed to England, and James I. then on the throne confirmed his countrymen, the M'Donalds, in

* Camden mentions the M'Willies (M'Quillans), and the circumstance of their being pent up in a narrow corner by the outrage and depredations of the Island Scots. A lineal descendant of M'Quillan lives on the road between Belfast and Carrickfergus, near the Silver stream, and probably enjoys more happiness as a respectable farmer, than his ancestor did as a prince in those turbulent times.

in the possession, giving M'Quillan Enishowen, in the county of Donegall, as an equivalent. But of that also he was soon deprived by his own improvidence, in a bargain with Lord Chichester, whose family still hold the barony of that name.

A considerable number from the same country also settled about Larne, under the family of the Bessets, one of whom fled from Scotland for the murder of a Duke of Athol; and at different times, under various leaders, the whole coast was occupied by them, and a part of Carrickfergus, which still is called the Scotch quarter from having been long their place of abode.

A dialect of the Celtic language has been long used among these people (though all can speak English); it is not pure, and with difficulty can be understood by those Scots, who speak that language in its purity. It is probably a compound of the language they brought with them, and the dialect of the same, which they found in the parts where they settled. The descendants of these people are active, frugal, and industrious; those, who inhabit the parts of the glens and mountains bordering on the sea, combining the sailor and fisherman with the farmer, &c. Those, who live in the Scotch quarter at Carrickfergus, are all fishermen. Upon
the

the whole, they form a most valuable part of the community, though in their manners they may not be so smooth as some of their neighbours.

The earliest English settlers, of whom any thing is known here, were those who came over to Carrickfergus on the first invasion, in the reign of Henry II.; but what attended their descendants, if they left any, we are ignorant of; their number was small, and, as they were soldiers, probably few survived. But from that time there were many arrivals in the different reigns, until the numerous colonies came in the reigns of Queen Elizabeth, and of James I. Those, who settled about Carrickfergus, were in the latter reign, and brought from Devonshire by Sir Arthur Chichester; their descendants retained some of the customs of their ancestors, within the memory of persons still alive; amongst these was the Devonshire mode of conveying grain in the straw and hay, in bundles, on the backs of horses, instead of carriages; these loads were supported by crooks of wood, whose natural bendings favoured the operation; two were placed on each side of the horse; they were turned outwards, and fastened to a kind of pack-saddle, tightly tied on by ropes, the one just behind the shoulder, the other near the flank;—and this custom originating in Devonshire, where the roads
are

are proverbially bad, was preserved until of late years near Carrickfergus, and the celerity, with which hay and grain were conveyed, can only be credited by those, who have seen it. The load or bundles of hay were called trusses, and hay is there still computed by that name. The narrow causeways, and immense divisional ditches, are also supposed to have had a Devonshire origin. Another part of this colony settled in the district of Malone, or Milone, adjoining to Belfast, where their descendants are still to be distinguished by their looks and manners, but particularly by the air of comfort about their dwellings, and a fondness for gardens and orchards. Near Belfast was likewise a colony of Lancashire and Cheshire men, settled there, as it is said, by Sir Moyses Hill; but from Malone to Lisburn, and thence over the greatest part of the barony of Masserene, and the south part of the barony of Antrim, but especially towards the west, the country is mostly occupied by the descendants of English settlers, and some Welch, who came over in the reign of Elizabeth, in great numbers, and also in the beginning of James I. with the different great families, that at different times obtained grants of lands here.—Upper Masserene was colonized by the Seymours, Lords Conway, and Sir George Rawdon; part of

Lower Masserene also; the remainder, and part of the barony of Antrim by the Skeffingtons, Langfords, and Nortons, which last came in the reign of Elizabeth.* Great civilization, and a superior degree of culture, were the consequences, which followed the bringing in of these different colonies, which to this day may be traced as far as they extend; their descendants being distinguished by their comfortable habitations, and well planted farms, as also by their manners, which have a great deal of natural civility and attention. They are very industrious, but are much inclined to enjoy part of the effects of their industry in the society of their acquaintances and friends.

The next era in the colonization of this county (in which the county of Down must also be comprehended) was the introduction of the Lowland Scots. This likewise took place in the reign of James I.

In the 34th of Philip and Mary a law was passed, "against bringing in of Scots, retaining or intermarrying with them." But such was the state of this country, it was necessary to repeal that law; from which repeal may be dated the
first

* I find, among the names of English origin, that of Becket and Wickliff.

first successful attempt at the introduction of those people into the north of Ireland by King James. Their first minister, Edward Brice, settled at Broad Island, near Carrickfergus, in 1611, and the Rev. Robert Cunningham at Hollywood; at the same time the lowland Scots were brought into the county of Down under the Hamiltons and Montgomeries. This division extended from Donaghadee to Portaferry, penetrating into the country within half a mile of Belfast, and stretching to the very centre of it. Three other ministers from England settled about the same time; the Rev. J. Ridges, at Antrim, brought by the Clotworthies, who were themselves presbyterians, and Henry Calvert, and Mr. Hothard, at Carrickfergus, which last came over under the auspices of Lord Chichester. With these came a sufficient number of their people to form their congregations. About the time of the rebellion in 1641, Josias Walsh was settled at Templepatrick; he was grandson to the famous John Knox, the Scotch reformer.

At different times the population of Ulster was much forwarded by the severities exercised against the presbyterians both in England and Scotland; and their conduct in Ireland, in 1633, had been such as to induce the Parliament of Ireland to pass an act for the naturalization of all the Scotch
natives

natives born before the accession of James I.— And at the breaking out of the rebellion in 1641, the government of Ireland proposed, as also the governments of England and Scotland, that 10,000 Scots should be sent over; numbers accordingly arrived, and took possession of the castle of Carrickfergus, and brought over their ministers with them. The presbytery, first established in 1642, discovered their predilection for the principles of the constitution, by framing a protest against the murder of Charles the first by the English republicans; which protest drew upon them the indignant pen of Milton,* and, in 1648, the sword of General Monk, who surprized them at Carrickfergus, and took their General, Munroe, prisoner, whom he sent to England. After this period, peace being shortly established, the industry, attention, and numbers of this body were so great, that by their exertions they possessed themselves almost exclusively of the linen, and other branches of trade, after the woollen manufacture was lost to Ireland by the compact between the two countries, which established the linen as the staple of one, and the woollen trade as that of the other.

This settlement of a great body of men, such

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* This tract is preserved in Milton's prose works.

as the Scots were, took place at a most critical time; and their exertions, joined to those of the English colonists, whose principles and habits, as well as theirs, were in total opposition to that of the natives, proved such a counterpoise to the designs of the latter, as must ever be considered as an event of the greatest consequence in the history of this country; and, if it was brought about with that view, it must be looked upon as a great stroke in state policy— Probably to it the existing connection between Ireland and England at this day may be attributed. Numerous as the weaknesses may have been of the monarch, under whose reign it occurred, the measure was founded in profound wisdom, insomuch that it leaves room for conjecture, that it had its origin in the genius of Lord Verulam. Besides its preserving the British and Irish crowns at that time on one head (without which both countries would probably have fallen a prey to other powers) it introduced a spirit of active industry and sober manners, which place the inhabitants of Antrim and Down nearly on an equality with the Dutch in their first period. These happy consequences were early predicted by Sir John Davis, the Attorney General, who saw in it the salvation of both countries.

NOTE.

Erroneous accounts have been at different times circulated, and very recently revived,* of the massacre at Isle Magee, in 1641, by Scotch soldiers from the garrison of Carrickfergus. By the grossest exaggeration, the number, that perished, has by one party been stated at *three thousand*, but reduced by Dr. Leland, in his History of Ireland, to *thirty families*. The benevolent reader will have pleasure in being informed, that the actual sufferers did not exceed *thirty persons*. It has also been propagated, in extenuation of divers scenes which ensued, that the atrocious deed in question *preceded* the breaking out of the rebellion. That, also, is palpably wrong. It did *not* take place for nearly three months *after* it: viz. on Sunday, the 8th of the succeeding January.

The detection of both these errors is found in the depositions in Trinity College, made in the reign of Charles II. by persons, whose feelings were naturally irritated by the loss of their friends, and consequently well inclined to publish the evil in its utmost magnitude.† **Lord Clarendon's** name has been adduced in support of the assertion, that the atrocity at Isle Magee took the lead of the rebellion.

* By Mr. Plowden and Dr. Milner.

† Vol. Depositions, lettered "County Antrim," page 2716, &c.

lion. Mr. Plowden, by turning to his lordship's history, which he ought to have done in treating, himself, on the subject, would have found, that his lordship, in direct terms, declared the contrary : for, the rebellion, he says, broke out " without so much as the least pretence of a quarrel, or hostility so much as apprehended by the Protestants." Annalists, in the present enlightened age, ought to examine the foundation of any severe reflections, before they make them; they would then find, that the noble lord, alluded to, never countenanced the report, of which they would make him the author. They would discover, that, in 1662, it first made its appearance as a London anonymous pamphlet, " printed for its author, under the initials " R. S.;" and that, *fifty-eight years after*, in 1720, it was subtly bound up at the end of Lord Clarendon's work, under the specious name of *AN APPENDIX, when his lordship was forty-six years dead.*

The foregoing note, furnished by a gentleman of great accuracy and research, is inserted for the purpose of doing away an imputation, not for re- crimination, which the writer disclaims—thinking, that every thing, which in any degree tends to keep up animosities of any kind in this kingdom, must ultimately serve our common enemy.

The

The descendants of these people, who now occupy nearly three-fourths of the counties of Antrim and Down, are, in their manners decent, in their conversation chearful, and, for their stations, well informed, though they do not seem to possess much constitutional vivacity. From their constant intercourse in so populous a country, and from the habits of dealing, in consequence of their frequenting markets for the disposal of their manufacture, and the produce of their lands, they are acute in making bargains of all kinds; and in their mode of living they are frugal, but not too parsimonious. They still retain the ideas of religious independence, which they derive from their forefathers, and with it their dialect, which in some degree prevails in all that tract of country inhabited by them. They are neither so fond of planting nor of gardening as the descendants of the English, though of late years they have made a considerable progress in both, and in all the necessary steps towards improvement, which their various means can enable them to arrive at.

As the times have become more enlightened, and individuals consequently better informed, and more enterprising, there are numerous instances, where the descendants of the several colonists, having turned themselves to different professions
and

and occupations, by their exertions have now raised themselves or their children to stations, which, half a century ago, would not have been thought attainable; — but, with such opportunities as this country affords, there is nothing reasonable, to which well-directed enterprize, persevering industry, and proper attention to economy may not aspire.

In speaking of the total number of the population of the county, the most authentic general account to go upon is that published about 1790, and taken about two years before, in 1788, by Mr. Bushe, from the return of the hearth-money collectors. Though it may have errors, this report has as fair a chance of being correct as any other; by it, the population is made at that period to be 160,000, inhabiting 29122 houses, thirteen acres and three roods to a house, and 260 persons to a square mile.

Mr. Newenham, a late writer, speaking of the population of Ireland, says, that it doubles in forty-six years; that being the case, if it increases proportionably in any given number of years, twenty-three years having now elapsed since the numbers given were made out, the increase must then be one half of 160,000, which, added

to it, makes the whole at present amount to 240,000. From the rapid increase of houses, which have been built in this country within the time mentioned, and from the proportion that the new houses bear to the old, I am much inclined to think the above addition not to be more than the truth. To this view of the population I shall add some curious particulars, which, having been taken in different parts of the county, will give a general idea of the distribution of land throughout it. That furnished by the Rev. Robert Trail, of his own parish, is an invaluable document. The account of the stock, &c. in the baronies of Carey and Dunluce, given to me by the same gentleman, will be found worthy of attention.

The distribution of farms, also, on the Marquis of Hertford's estate, shews the state of farming population in the half-barony of Masserene, though it does not contain the general population of that district; and the statement of the united parishes of Glenavy, Camlent, and Tullyrusk, on the same estate, gives a curious picture of the farming property contained in a tract of about 10,600 Irish, or 17,000 English acres.

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Abstract of the population of the parish of Ballintoy.

	1802	1803	Increase.		
Men	-	-	52	Baptized in 1804,	Males
Women	-	650	64		- 46
Married Persons	-	742	116		Females
Sons	-	1392	58		- 49
Daughters	-	993	35		95
Males	-	1034	110		
Females	-	1643	99		
Established Church	-	1741	136		
Dissenters	-	1939	57		
Protestants	-	940	193		
Catholics	-	2879	16		
Families	-	505	22		
Souls	-	679	209		
Number to a Family	-	3384	—		
Protestant to a Catholic	5	582	5		
	53	507	0		
		516			

I suppose only those of the Established Church are here meant, those of other religions being baptized by their own clergy.

The number of acres in this parish being 7297, and the number of families, in 1803, being 701, gives about 10½ acres to a family, nearly one person to two acres.

*Employments, &c. in the Parish of Ballintay,**April, 1803.*

Bastards	-	49	Mill-carpenter	-	1
Blasters of stone		5	Millers	- -	5
Blind	- -	10	Mowers	- -	7
Boat-carpenters		2	Poor	- - -	33
Breeches-makers		2	Rabbit-hunters	-	5
Butchers	-	6	Reed-makers	-	2
Carpenters	-	11	Sailors	- -	8
Coopers	-	5	Salmon-fishers		21
Dumb	- -	2	School-masters	-	8
Fiddlers or Pipers		4	Sealer of linen	-	1
Fish-carriers	-	10	Male servants	-	32
Fishers	- -	82	Female servants	-	60
Flax-dressers	-	3	Shoe-makers	-	25
Flax-scutchers		7	Slater	- -	1
Glazier	-	1	Smiths	- -	17
Huxters	-	16	Tailors	- -	20
Insane	- -	9	Truggers	- -	8
Letters of blood		3	Thatchers	- -	5
Licenced for spirits		3	Weavers	- -	288
Mantua-makers		2	Wheel-wrights	-	7
Masons	- -	13	Yarn-buyers	- -	3
Midwives	-	2	Yeomen	- -	118

Live

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Live Stock &c. &c. in the parish of Ballintoy,

April 7, 1803,

Bee-hives	-	24	Boats	-	31
Calves	-	493	Cars	-	426
Cows	-	2312	Clocks	-	14
Dogs	-	367	Crow-irons	-	61
Foals	-	8	Harrows	-	397
Geese	-	287	Ploughs	-	198
Goats	-	2	Looms	-	256
Horses	-	622	Reels	-	664
Sheep	-	1221	Spinning-wheels	-	1182
Swine	-	495	Sledges	-	31
Turkeys	-	96	Watches	-	21

Return

*Return of Stock, &c. for the baronies of Carey,
Upper, and Lower Dunluce.*

These baronies run far into the mountains, although in many parts the lands are of equal quality with any in the county, especially on the sea-coast, about Ballymoney and other places.

Oxen and bulls	924	Leather, cwt.	1069 $\frac{1}{2}$
Cows	- 13289	Wool, cwt.	72 $\frac{1}{2}$
Young cattle	6689	Loads, fuel	281869
Sheep and goats	8684	Yards, linen	61745
Pigs	- 4400	Yards, woollen	14662
Horses	- 4961	Salt, cwt.	1606 $\frac{1}{2}$
Carts	- 48	Spirits, gallons	7750
Cars	- 3715	Iron, cwt.	538
Barrels, wheat	1506	Axes	- 2527
Barrels, oats	64675	Picks	- 306
Barrels, barley	7040 $\frac{1}{2}$	Spades	- 5920
Loads, hay	21651	Shovels	- 4146
Loads, straw,	57424	Bill-hooks	- 115
Flour, cwt.	685 $\frac{1}{2}$	Saws	- 968
Oaten-meal, cwt.	4681 $\frac{1}{2}$	Crow-irons	- 531
Butter, cwt.	260	Sledges	- 236
Cheese, cwt.	19 $\frac{1}{2}$	Ladders	- 935
Flax, cwt.	1500 $\frac{1}{2}$	Hand-barrows	656

Box-barrows,

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Box-barrows	391	Drivers	1131
Deal-boards	21487	Refusals	821
Volunteers	2692	Boats	160
Pioneers	346	Pilots	3

The above-mentioned baronies comprehend the following parishes, and contain 101,680 Irish acres:

Romoan,	Dunluce,
Coulfeightrin,	Ballyrashane,
Billy,	Ballywellan,
Armoy,	Loughgeel,
Rathlin,	Kilraughts,
Ballintoy,	Ballymoney.
Derrykeighan,	

Extracted from the returns of the different constables;

16 January, 1804.

ROBERT TRAIL.

The

The Marquis of Hertford's estate contains about 44,500 Irish acres; of tenants, who have leases from his lordship, I understand there are about 3,600, which gives to each tenant about twelve and a half Irish acres, or twenty English; but many farms on it contain one hundred acres, and some much more; the above is supposed the medium of acres to a farming family; but besides this there are on the same the town of Lisburn, the villages of Stoneyford, Glenavy, Upper and Lower Balinderry.

On the same estate, in the parishes of Glenavy, Camlent, and Tullyrusk, there are 481 farms. These parishes contain about 10600 Irish, or 17000 English acres, which gives something more than 21 and a half Irish acres to a family; some of the largest farms on the estate lie in this tract. Many of these, however, are sub-divided.

The particulars of the stock on the same, in the year 1803, were on these 481 farms, 42 saddle horses, 420 draft ditto, 55 oxen, 1121 cows, 920 young cattle and colts, 228 sheep and goats, 755 pigs. As there are many grazing farms in those parishes, the cattle on them are not reckoned, as, at the time of the year (November) this account was taken, they were removed or sold. The
remaining

remaining stock at the same time was computed at 373 * cars, 491 boles † of wheat, 4176 boles of oats, 105 boles of barley, 6037 loads of hay, 8398 sacks of potatoes, 14 cwt. of flour, 403 cwt. of oat-meal.

From this view of the division of lands in this county, which also extends into those bordering upon it, and from considering the number who do not occupy any land, a supposition might arise, that this part of Ireland was insufficient to maintain its own population; but happily the case is quite the reverse; for the state of agriculture and industry are such, that an exportation of grain and provisions takes place annually; and that this country, which, when more thinly inhabited, required assistance, is now able to afford it to others.

3 M

Island

* This shews how small some of the farms are, not admitting the owners to keep a horse and car, but depending on others for their drawing work—481 farms; only 373 cars.

† A bole of any grain is about ten bushels; of potatoes about seven.

Island of Rathlin.

To the population of the county of Antrim must be added, that of the Island of Rathlin or Raghery. The best view of this detached spot being contained in Dr. Hamilton's Letters on the Coast of Antrim, I have extracted from them what seems necessary to say respecting it. It is about five miles in length, and three quarters of a mile in breadth, being bent in an angle towards the middle. It lies opposite to Ballycastle, and forms a tolerable bay; but in a westerly wind, though the anchorage is good, few vessels can ride it out, from the swell along the coast. By a return given to Parliament by Mr. Gage, the owner, in 1758, it appears to contain about 2000 plantation acres, and then had 130 families living on it, which, at $5\frac{1}{2}$ to each house, would produce a population of 715. In an account taken, I should think, some time previous to 1790, by the priest of the island, the inhabitants are reckoned at 1100, which, for 140 houses, (the number at that time) would be near eight to a house. Dr. Hamilton thinks they are about 1200, but does not mention the houses.

The cultivated land is kindly enough, and produces

duces excellent barley. In a good year this has been exported to the value of 600*l*. But kelp is the great source of wealth to this island, one hundred tons of which have been exported from it in one year. At the time of Dr. Hamilton's writing, the price was 5*l*. 5*s*. per ton;—now, it is more than double.

The horses, as well as the sheep, are small, but serviceable; and the black cattle are not large, though they do well, when brought to the main land and better soil. This island contains no native quadruped except rats, and the little straw mouse, which is sometimes found. The inhabitants are a simple, laborious, and honest race of people, and possess a great degree of affection for their own country, always speaking of Ireland as of a foreign land. A common and heavy curse among them is, "May Ireland be your latter end," with which they have not much intercourse, from the difficulty of the passage, except in the way of their trade; in this line the town of Ballycastle is much frequented by them on the fair-days, where from their small boats they are seen landing their cattle, and other productions of their island, for sale. Dr. Hamilton observes traces of different characters among the inhabitants, the effect of their situations. On the western end they are remarkable for activity

tivity and bodily strength. A single native is here known to fix his rope to a stake, driven into the summit of the precipice, and from thence, alone and unassisted, to swing down the face of the rock in quest of the nests of sea-fowl; and, from the want of intercourse with others, these Kenramer men have many particularities, and the use of the Irish language is universal among them. On the Ushet end, which is well supplied with harbours, they are fishermen, accustomed to little voyages and to barter. Many of their particularities are lost, and they all speak the English language.

The monuments of antiquity are small tumuli; when opened, a stone coffin was found in one of them; and beside him, who was interred there, an earthen vessel stood, and the residuum, still visible, seemed to contain blood. Within the tumuli lay a considerable number of human bones, which might have been the remains of more ignoble men than the person, whose remains the coffin covered. Brazen swords, and spear heads, were found in the little plain where these tumuli are placed, and a large fibula, of no mean workmanship, which is deposited in the museum of Trinity College, Dublin.

The

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The remains of a fortress are yet visible on the northern angle of the island, celebrated for the defence made in it by Robert Bruce, and still known by the name of that hero. The antiquity of this building is therefore not much less than five hundred years; it may be older, as the time Bruce spent in Raghery was scarcely sufficient for building it.*

Militia and Yeomanry.

In addition to what has been detailed respecting the population of the county, the return of persons liable to serve in the militia is here given, at the two periods of 1793, and 1810, as furnished by the constables, and corrected by the Deputy-governors after hearing objections. At the former of these periods the numbers were † 21,079, at the latter, 24,425. But the yeomanry having been established since 1793, and being exempted from serving in the militia, and, consequently, not being returned by the constables, their numbers must be added

* In Hery's History of England it is said, Bruce took refuge in the small island of Ruerin, one of the Western Isles. Rueriu is an ancient name for Raghery.

† To the Rev. Robert Trail I owe the returns of 1793; to the Rev. Philip Johnson those of 1810.

added to the effective strength of the county; the amount of the yeomanry, therefore, being 5220, this number, when added to the above return of 24,425, makes the total 29,645, being an increase of nearly one half in seventeen years. It is out of this corrected return that 800 men (the number, of which the Antrim militia consists) are drawn, which is nearly one man out of thirty.

Some idea of the relative acreable population of the different baronies may be formed, from the number of men each barony was obliged to furnish in making up 104 recruits, who were required at a particular time to complete the militia.

Therefore, the number of acres in each is given below, and its quota of men :

<i>Baronies.</i>	<i>Acres.</i>	<i>Men.</i>	Thus, for example,
Belfast	65920	23	Glenarm, which contains
Masserene	43910	15	50240 acres, gives only
Antrim	67520	16	six men; whilst Toome,
Toome	48160	19	only 48160, gives 19; of
Glenarm	50240	6	consequence, the popu-
Dunluce	56320	10	lation of the latter is more
Kilconway	38569	7	than three times that of
Carey	45360	8	the former, though it is
			2000 acres less.

The

The yeomanry are forty-nine companies or corps of infantry, and nine troops of horse; the numbers of the whole are 5220, as stated before; of these, 1400 infantry, forming eleven corps, and two troops of horse, one of sixty, and the other of forty, are furnished by the estate of the Marquis of Hertford, making nearly two-sevenths of the whole.

SECT. 8. *Situation, Size, and Description of
Towns and Villages.*

Though these certainly form proper subjects for a statistical survey, they are here more particularly entered into (though some of the villages have been spoken of before) from observing the slight, and often erroneous relations given of places in works, which profess to describe them; as an instance of this, it is proper to observe, that one of those works, in speaking of Ballycastle, says, "that a *volcano* broke out there in 1798, which did infinite mischief, devastating the country to a considerable extent."—The towns and villages are assigned to their respective baronies, and are taken in a kind of geographical circuit, as nearly as could be done, beginning with Lisburr in the
south

south. Belfast, from its extent and commercial importance, forms an article of itself.

Lisburn, in the barony of Masserene, for size and population the second town in the county, was, in the reign of Elizabeth, only a small village, and at that time called Lisnegarvey. It lies about seven miles south of Belfast, on the river Lagan, which separates it from the county of Down. The original proprietor of the territory of Kilultagh, in which it stands, was an O'Neil of the Tyrone family. In the reign of James the first, Sir Fulk Conway obtained a grant of it. He induced a number of English and Welch families to settle there. From a plan of the town taken, it is thought, some time in that reign, and preserved in the Marquis of Hertford's office, it appears, that there were then fifty-three tenements in the place besides the castle. From this plan it is evident, that the centre of the town (all that was then in existence) has undergone but little alteration in shape, except what has been occasioned by the buildings near the Market-house; nor for many years after does it seem to have made any great progress: for in 1635, it is thus described by an English traveller: "Linsley Garvin, about seven miles from Belfast, is well seated

seated, but neither the town, nor country thereabouts, well planted (inhabited) being almost all woods and moorish, until you come to Dromore. The town belongs to Lord Conway, who hath a good handsome house there."

Lisburn is remarkable for a victory gained over the rebels on the 28th of November, 1641, commanded by Sir Phelim O'Neil, Sir Con Magenis, and General Plunket, little more than a month after the breaking out of the rebellion; Sir George Rawdon, who commanded the king's forces, having arrived at Lisburn on the evening before the battle.*

In 1662, the inhabitants of the town of Lisburn, on account of their loyalty to Charles the first and second, were, by the same patent which erected the church of Lisburn into a cathedral for the united dioceses of Down and Connor, dated October 27th of that year, empowered they and their successors to return two burgesses to parliament for ever; the sheriff of the county of Antrim, upon all summonses to elect a parliament, was obliged to send his precept to the seneschal

3 N

of

* A detailed account of this at the end of the article, taken from the vestry-book.

of the manor of Kilultagh, who was made the returning officer, notwithstanding the inhabitants were not a corporate body.*

In 1707, this town was burned to the ground. The castle, a fine building, shared the same fate as the other houses, and was never rebuilt. Part of the garden walls are still remaining, and the great terrace affords a most agreeable promenade, being well sheltered from the north by young plantations, and kept in the best order.

But that, which more particularly contributed to the rise of the town of Lisburn, was the settlement of many French refugees there (after the repeal of the edict of Nantz) who had been bred to the linen manufacture. Mr. Lewis Cromelin,† mentioned before, obtained a patent in 1699, which was afterwards renewed in the reign of Queen Anne, for establishing a manufacture of linen, and also, among other grants, one for £60 per annum for a French minister.‡ In consequence of this he settled

* Harris's manuscripts, Dublin Society.

† It is curious, that only three of the names are now in existence here, of those who first settled at Lisburn, viz. De Lacherois, Cromelin, and Goyer.

‡ The writer's father has been fifty-six years minister of the French church in Lisburn, and is only the third since its establishment; and, what is more remarkable, one of its clergymen only remained there about two years.

settled in Lisburn, and many of his countrymen also; the virtuous conduct, and civilized manners of these good people, were of great advantage to this place, and their skill and industry set an example to those, who were concerned in the same business as they were, which soon had the effect of raising the quality of their manufacture to a degree of excellence unknown till then; and the linens and cambrics made in the neighbourhood, and sold in Lisburn market, have until this day kept up their superior character.

Between thirty and forty years ago, many new houses were built in Lisburn, and some have been built since; but at present it seems stationary in that particular; and, though its vicinity to Belfast prevents it from being a place of much trade, there is a great deal of business done in it, in various ways. But, from the present imperfect state of the land, it does not derive so much advantage as might have been expected. On market days it is much frequented, from the quantity of linen and other things brought to it, and it is well known as the first place to meet with oats of the best quality for seed; there is also a cattle market every Tuesday, besides its two fairs. A few years ago a fine spire of cut stone was built to the church;
and

and lately a steeple and cupola on the market-house, the rooms of which the Marquis of Hertford is fitting up anew, with some additions, as the place of assembly for the town.

The houses of worship are, a spacious church, a Presbyterian meeting-house, a Quaker meeting-house, a handsome Catholic chapel, and a Methodist chapel.

In the town is a classical school kept by Mr. Hudson; and, to the north of the town, is a school for Quakers (to which all other denominations are also admitted) built by a legacy from Mr. John Hardcock. At present there is a free school established on the Lancastrian plan, 29th May, 1811. The managers are two young gentlemen of the town,* who, for their attention to so laudable a purpose, deserve the greatest praise. Though this school commenced so lately, and only with twenty-five scholars, it is now increased to one hundred and fifteen; and, had the managers a school-house sufficiently large, they could teach double the number. For the regulations I must refer to the printed statement.

Another very laudable institution is, the Humane Society for the restoration of suspended animation in persons, who have either been im-

mersed

* Messrs. Thos. Cupples and — Crossley.

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mersed in water (as frequent accidents in this way occur from the nearness of the river and canal) or from any other cause.

The county infirmary contains twenty beds, and gives relief to a number of externs. It is situated in an airy part of the town, where the duties of the surgeon are skilfully and conscientiously discharged by Dr. Stewart. Each governor can recommend forty externs per year, and as many for advice as they think fit. They also recommend for interns, whenever there is a vacancy.

Lisburn contains about 800 houses, which, at six persons to a house, would make the population 4812. In the Survey of the county of Cork, eight is the number allowed in the towns for each house. In that case the population would be 6416, which appears to be too much, though all the houses in the principal streets are from two to three stories; $6\frac{1}{2}$ to each, or 13 to two houses, seen, from the accounts taken of the population of the towns in the north of Ireland, to be nearer the fact;—according to this, Lisburn contains 5212.

Among the many advantages, enjoyed by this place, is the constant supply of excellent water brought to every house, at the small expense of sixteen shillings per annum.

“ *Lisnagarvey,*

“ Lisnegarvey, the 28th of November, 1641.

“ A brief relation of the miraculous victory gained there that day over the first formed army of the Irish, soon after their rebellion, which broke out the 23d of October, 1641.

“ Sir Phelemy O’Neill, and Sir Conn Maginnis, their General then in Ulster, and Major-general Plunket (who had been a soldier in foreign kingdoms) having enlisted and drawn together out of the counties of Armagh, Tyrone, Antrim, and Downe, and other counties in Ulster, eight or nine thousand men, which were formed into eight regiments, and a troop of horse, with two field-pieces. They did rendezvous on the 27th of November, at and about a house belonging to Sir John Rawdon, at Brook-hill, three miles distant from Lisnegarvey, in which they knew there was a garrison of five companies newly raised, and the Lord Conway’s troop of horse. And their principal design being to march unto and besiege Carrickfergus, they judged it unsafe to pass by Lisnegarvey, and therefore resolved to attack it next morning, making little account of the opposition, that could be given them by so small a number, not half armed, and so slenderly provided of ammunition,

aition, (which they had perfect intelligence of by
 several Irish, that left our party and stole away to
 them) for that they were so numerous, and well
 provided of ammunition by the fifty barrels of
 powder they found in his Majesty's store in the
 castle of Newry, which they surprized the very first
 night of the rebellion; also, they had got into
 their hands the arms of all the soldiers they had
 murdered in Ulster, and such other arms as they
 found in the castles and houses, which they had
 plundered and burned in the whole province. Yet
 it so pleased God to disappoint their confidence;
 and the small garison they so much slighted was
 much encouraged by the seasonable arrival of Sir
 George Rawdon, who, being in London on the
 23d of October, hasted over by the way of Scot-
 land, and, being landed at Bangor, and got to
 Lisnegarvey, though late on the 27th of Novem-
 ber, where those new-raised men, and the Lord
 Conway's troop, were drawn up in the market-
 place, expecting hourly to be assaulted by the
 rebels, and thus stood in that posture all the night;
 and before sunrise sent out some horse to discover
 their numerous enemy, who were at Mass (it being
 Sunday); but, immediately upon sight of our scouts,
 they quitted their devotion, and beat drums, and
 marched directly to Lisnegarvey, and before ten of
 the

the clock appeared drawn up in batallia, in the warren not above a musket shot from the town, and sent out two divisions, of about six or seven hundred a piece, to compass the town, and plant their field-pieces on the high way to it, before their body, and with them and their long fowling-pieces killed and wounded some of our men, as they stood in their ranks in the market-place; and some of our musketeers were placed in endeavouring to make the like returns of shot to the enemy. And Sir Arthur Terringham (governor of Newry) who commanded the garrison, and Sir George Rawdon, and the officers, foreseeing, if their two divisions on both sides of the town should fall in together, that they would overpower our small number. For prevention thereof a squadron of horse, with some musketeers, was commanded to face one of them, that was marching on the north side, and to keep them at a distance as long as they could; which was so well performed, that the other division, which marched by the river on the south side, came in before the other, time enough to be well beaten back by the horse, and more than two hundred slain of them in Bridge-street, and in their retreat, as they fled back to the main body. After which expedition the horse, returning to the market-place, found the enemy had forced in our
small

small party on the north side, and had entered the town, and was marching down Castle-street, which our horse so well charged there, that at least three hundred were slain of the rebels in the street, and in the meadows behind the houses, through which they did run away to their main body; whereby they were so much discouraged, that in almost two hours after their officers could not get out any more parties to adventure a second assault upon us; but in the main space they entertained us with continued shot from their main body, and their field pieces, till about one of the clock, that fresh parties were issued out, and beaten back as before, with the loss of many of their men, which they supplied with others till night; and in the dark they fired all the town, which was in a few hours turned into ashes; and in that confusion, and heat of the fire, the enemy made a fierce assault. But it so pleased God, that we were better provided for them than they expected by a relief, that came to us at night-fall, from Belfast, of the Earl of Donegall's troop, and a company of foot commanded by Captain Boyd, who was unhappily slain presently after his first entrance into the town. And, after the houses were on fire, about six of the clock till about ten or eleven, it is not easy to give any certain account or relation of the several encounters in

divers places of the town, between small parties of our horse and those of the enemy, whom they charged as they advanced, and hewed them down, so that every corner was filled with carcasses, and the slain were found to be more than thrice the number of those that fought against them, as appeared next day when the constables and inhabitants, employed to bury them, gave up their accounts.—About ten or eleven o'clock their two generals quitted their station, and marched away in the dark, and had not above two hundred of their men with them, as we were informed next morning by several English prisoners that escaped from them, who told us, that the rest of their men were either run away before them, or slain; and that their field-pieces were thrown into the river, or in some moss pit, which we could never find after; and in this their retreat, or rather their flight, they fired Brook-hill house, and the Lord Conway's library in it, and other goods, to the value of five or six thousand pounds, their fear and haste not at all allowing them to carry any thing away, except some plate and some linen; and this they did in revenge to the owner, whom they heard was landed the day before, and had been active in the service against them, and was shot that day, and also had his horse shot under him, but mounted presently upon

upon another; and Captain St. John and Captain Burley were also wounded, and about thirty men more of our party, most of whom recovered, and not above twenty-five or twenty-six more slain. And if it be well considered, how meanly our men were armed, and all our ammunition spent before night, and that if we had not been supplied with men, by the timely care and providence of the Earl of Donegall and other commanders, from his Majesty's store of Carrickfergus (who sent us powder post in mails on horseback, one after another) and that most of our new-raised companies were of poor stript men that had made their escapes from the rebels, of whom they had such a dread, that they thought them not easily to be beaten, and that all our horse, (that did the most execution) were not above 120, viz. the Lord Conway's troop, and a squadron of the Lord Grandison's troop (the rest of them having been murdered in their quarters in Tanragee) and about forty of a country troop and company from Belfast came to us at night. It must be confessed, that the Lord of Hosts did signally appear for us, who can save with or without any means, and did by very small means give us the victory over his and our enemies, and enough of their arms to supply the defects of our new companies, and about fifty of their colours and drums.

But

But it is to be remembered with regret, that this loss and overthrow did so enrage the rebels, that for several days and weeks after they murdered many hundreds of the Protestants, whom they had kept prisoners in the counties of Armagh and Tyrone, and other parts of Ulster, and tormented them by several manners of death. And it is a circumstance very observable, that much snow had fallen in the week before this action, and on the day before it was a little thaw, and a frost thereupon it in the night, so that the streets were covered with ice, which proved greatly to our advantage; for that all the smiths had been employed that whole night to frost our horses, so that they stood firm, while the brogues slipt and fell down to our feet. For which, and our miraculous deliverance from a cruel and bloody army, how great cause have we to rejoice, and praise the name of our God, and say with that kingly prophet "If it had not been the Lord himself who was on our side, when men rose up against us, they had swallowed us up quick, when they were so wrathfully displeased at us. Yea, the waters of the deep had drowned us, and stream had gone over our soul; but, praised be the Lord, who has not given us over a prey unto their teeth, our soul is escaped, even as a bird out of the snare of the fowler; the
snare

snare is broken, and we are safe. Our hope standeth in the name of the Lord, who made heaven and earth." Amen!"

To the north of Lisburn is the village of Stoneyford, on the old road to Antrim, and a most impracticable road it is, made before the discovery, "that it is often as short, and always an easier method to go round the base of a steep hill than to climb over its summit."* At a few miles distance, and near the shore of Lough Neagh, lies the village of Glenavy, containing between fifty and sixty houses; and, nearer to Antrim by two miles, Crumlin, a larger village, of the most neat and cheerful appearance; it consists of 100 houses, containing 110 families, and 570 persons; at one extremity of which is the academy, kept by the Rev. Nath. Alexander, and, at the other, the beautiful cottage and ornamented scenes of Glendarragh. The river, which runs through this improvement, is known for the fine specimens of petrification, which it affords; one of which, lying near Cider Court, is most remarkable, being the entire root, a cube of five feet, which has undergone this curious natural operation. An extensive flour-mill adjoins this place. These villages likewise lie in the barony of Masserene.†

Antrim

* Derry Survey.

† Masserene is said to signify a beautiful portion—a name truly descriptive of the barony

Antrim,* which stands in the barony of the same name, was a borough town before the union. It is well situated for the Lough Neagh trade, as the Six-mile water, which runs through it, forms a harbour for such vessels as may navigate it. The state of this town is not such as it was, and still ought to be from its position in one of the most fertile parts of the county, and so near to water-carriage; but many circumstances have combined to reduce it from its former prosperity, which certainly, with attention, does not seem to be irretrievable. There is an ancient mansion belonging to the Masserene family close to the town, which for many years had been much neglected; the present Lord Masserene is improving, and, it is said, intends to make it his residence. There is a great quantity of fine trees about it, and also in the park, which lies to the south of the town, and comes close to the lake. The silver fir grows in this park to a great size. Near the town is one of the most perfect round towers at present in existence, which is mentioned in its proper place. There is, likewise, an old church with small Gothic windows, and two meet-
ing

* Antrim was burned by General Munroe, in 1649.

ing-houses. On the river side is an extensive flour-mill. In 1800 there were 382 houses,* which have not since much increased. Reckoning each house at $6\frac{1}{2}$, or 13 persons for two houses, the population amounts to 2183. The sessions are held in this town. I shall close this account of Antrim with an extract from Clarkson's Survey of Ireland: "Near this place Sir Robert Savage slew, in one day, 3000 of the enemy with a small party. Before the engagement he gave every Englishman a good dose of good wine or ale, of which he had good store; besides this, he ordered, that sheep, oxen, venison, and fowl both wild and tame, should be killed and made ready for the conquerors, whoever they should be, saying, it would be a shame, that guests should come and find him unprepared. It pleasing God to bless the English with victory, he invited them all to supper, to rejoice with him, saying, I thank God because it is better to save than to pour on the ground, as some advised. Sir Robert Savage was buried in the convent of the friars Predicants of Coulrath (Coleraine) near the river Bann."

The

* Several of the houses were built in the old English stile of frame-work, filled up between with lath and plaster.

The barony of Antrim likewise contains the village of Kells, already spoken of for its neatness, and fine white-thorn hedges, and the village of Connor, which gives name to the see, a very poor place indeed. Broughshane to the north, on the river Braid, has about 100 houses, though few very good ones. Near it is Tullymore lodge, well situated above the town, on a branch of the same river. To the east lie the ruins of the ancient church of Skerries; this parish, in old accounts of the diocese of Connor, was called *Vera Deserta*.

Doagh lies to the north-east of Antrim, near the Six-mile water, and contains about 30 houses. In this village is a book-club, furnished with many valuable works, and with globes, &c.; and it is said that, since its establishment, the barbarous practice of cock-fighting has been entirely given up in the neighbourhood. Close to it is Fisherwick lodge, a hunting seat belonging to the Marquis of Donegall; the building itself, which is very handsome, and the plantations have much improved and enlivened the look of this well placed hamlet, which has, in addition, a good inn.

Ballyclare, which lies farther up the same river, and close to it, is well known for its horse fairs and monthly market for linens. It contains about

102 houses, supposed to be inhabited by more than 600 persons.

In the barony of Toome is Randalstown, on the Main-water, about two miles to the north of Lough Neagh. The situation is good, and the view from the bridge remarkably fine, whether up the river towards Mr. Dickey's, or downwards to the woods, that hang over the river and form part of the scenery of Shane's-castle park. In 1800, this town contained fifty-one houses, and was a borough before the union. It has a good monthly market for linens on the first Wednesday, a church, and meeting-house.

Not far from thence, on the Main-water, were formerly iron-works, which of late years have not been worked; whether from want of ore or of fuel, it is not said.

Ballymena, one of the towns where quarter-sessions are held, is in the same barony on the Braid river. It is a most thriving place, containing above 2500 inhabitants, having a weekly market on Saturday for horses, cows, &c. There is also a regular sale of butter for exportation. The linen, of which there is a considerable quantity sold, is $\frac{3}{4}$ wide, and excellent in quality. There are a few old houses in the town built after a different fashion

from the rest, having their gable ends to the front. In one direction an entire new street has been lately built. From whatever cause it proceeds, this is one of the most prosperous places in the county, though so far inland; and, as the markets are much frequented, there are two very comfortable inns. Wherever the linen-draper regularly attend, decent accommodation at least may be expected. About the centre of the town is the market-house, with a steeple sixty feet high, and near it a remarkable mount, called the moat.

Ahoghill is a thriving village, with a good monthly market for linens, held on the Friday after Ballymoney market, and two tolerable houses for the reception of travellers.

Toome, and Portglenone, are villages on the Bann; near the former, on the Derry side, was a castle built to defend the pass on that river. It was taken in 1650 by the Popish bishop of Clogher, and retaken by Colonel Venables. Its situation between the two lakes must have made it a station of considerable consequence in maintaining a correspondence between the counties of Antrim and Derry, which was formerly done by a ferry—now by a noble bridge. A large inn was built in this place some years ago.

Portglenone

Portglenone consists of one large street, leading to a bridge over the Bann. It seems to be an improving place, as several houses have been lately built; its linen market is held the third Tuesday in each month.

In the barony of Dunluce the principal place is Ballymoney. This town is scattered over an extent of about three quarters of a mile, from the Milltown, on the Rathsharkin road, to the Roaden or Bawdon foot; it contains 309 houses, including a population of about 1800 persons. Here is a good monthly linen market, and butter is sold there to be carried to Belfast for exportation. The monthly market for linens, held in this town, is on the first Thursday. Quarter sessions are also in their turns held in it.*

The village of Dervoch has been mentioned before, as belonging to the late Lord Macartney, and having been much encouraged by him as a residence for manufacturers. There are in this village about 80 houses, many of which were built by the owner; since his death no additions, I believe, have been made to it. On the coast, just at the verge of the county, is the fishing village of Portrush, with the safe and commodious sandy bay; the peninsula, which runs
towards

* To the Rev. Mr. Oulten I am indebted for this information.

towards the Skerrie islands, is well known from having been the subject of several discussions on basaltic subjects by Dr. Richardson. It was in his Portrush meadows that he first noticed the stolones of the *agrostis stolonifera*, commonly called fiorin grass, upon which so much attention has since been brought, and, what is singular, the celebrated Dr. Davy was then on a visit to him. Dr. R. has told me that he stated, and then shewed to him the young stolones rising without panicles such as the stalks of all other grasses have. To ascertain what this unusual appearance led to, it was agreed between the two gentlemen to leave parts of the meadow uncut, and watch the result, which was that these headless stalks continued steadily increasing their length, and of course adding prodigiously to the crop. Dr. R. lately at Annahilt, August 8th, the very same season of the year, on which he had first discovered the stolones, pulled up handfuls of grass from part of a meadow there, and first, picking out the seed-stalks of the other grasses, shewed that the young stolones of the fiorin were far more numerous; and of course (had not most of the meadow been already mowed) by reserving it there would have been a rich crop of fiorin grass. It must be observed, that the ground was
part

part of a reclaimed turf bog, the most favourable of all soils for this grass, where it comes naturally, and (as it has already been observed) will in time beat out every competitor.

To the east of Portrush, is Bushmills at the short distance of two miles from the Giant's Causeway. Were the accomodations of this village more extensive, both the owners of the inn, and the traveller, who visits that stupendous natural curiosity, would undoubtedly find their advantage.

The barony of Kilconway contains only the villages of Clogh, Clogh-mills, and Rathsharkin. The first of these contains about seventy houses, scattered over a good space of ground, in a very exposed situation; the other two are merely hamlets.

In the barony of Carey, to the east of Portrush, the village of Ballintoy, of between sixty and seventy houses, near the sea offers many curious and romantic views. White-park and the different inflections of the coast, with the ruptured masses of basalt and limestone, from the various forms they are thrown into, must strongly interest the beholder; and, though the coast is unadorned with trees, their absence is in some measure compensated for by the number of curious objects, that continually are presented to his view. Near this
village

village the fossil wood has been dug up in large quantities, and at a short distance from it is the hospitable mansion of Mount Druid, whose name is taken from the cromlech, that stands on the hill above it. Passing eastward from thence to Ballycastle along the shore, the road leads over the basaltic hill of Knocksohy, where the heads of the columns appear on a level with the road, shewing a regular polygon pavement, the stones, which compose it, being completely stripped of their covering, so that scarcely any other part of the coast offers a finer specimen of the manner, in which these stones of various angles are calculated to fill up spaces.

So much has already been said of Ballycastle, it is only necessary to add, that it consists of an upper and lower town; the latter is called the quay; the road, that lies between, is bordered with fine timber, though so near the ocean, the hills which interpose affording shelter from the blasts, which, in more exposed situations, being impregnated with the salt-spray and unbroken in their violence, are so fatal to all trees, except the elder, which in the bleakest exposure braves their efforts.

Ballycastle was called in the Irish language Ballycashlain or Castletown from a castle built there by the Antrim family in 1630, of which
there

there are still some remains. It contains one hundred and fifty two houses,* and about seven hundred inhabitants.

Cushindall, in the barony of Glenarm, which has lately been new-named Newtown Glens, is beautifully situated on the stream of Glenagan, which falls into the bay of Cushindall. This place is well adapted to please those, who wish to make excursions to the romantic country, which lies about it; and a most comfortable though small house of entertainment, to retire to, contributes to render some days residence there the more agreeable; and, as the arrangement of the coast thereabouts, and a considerable portion of the materials, of which the mountains and vallies are formed, is totally different from the rest of the county, it is well worth the attention of the mineralogist. After passing the curious and conspicuous point of Garron, at some distance from thence to the south is the fishing village of Carnallock on a fine strand, where the traveller may halt with pleasure, to dwell

* The account of the houses was given to me by the Rev. Luke Aylmer Conolly, whose description of Bona Marga, published in the Belfast Magazine, I have also made use of. In the southern part of this barony is the village of Armoy, a small place, and only remarkable for the remains of a round tower.

dwell upon the different views, that nature offers to his contemplation before he proceeds to Glen-arm, still a few miles farther to the south, which stands well on the bay of that name; the town itself, consisting of near two hundred houses, does not offer any thing inviting; but the residence of the Antrim family is close to this place; around it are numerous plantations, and amongst many foreign trees, which were cultivated there by the grandfather of the present Countess of Antrim, myrtles and other tender shrubs grow freely in the open air, and attain a large size. At some short distance to the south is the great deer-park in the openings of the mountains, and watered by the fine torrent, that runs into the bay; formerly the timber was very fine, and in considerable quantity; the venison it produces is accounted the best in this part of Ireland. On the shore to the left hand of the road to Larne is the little park, formed into the shape of a bow by a succession of precipices, which rise from the sea shore like terraces; many of the numerous beauties of this interesting spot are indestructible, though the timber, which fringed the faces of the rocks, is now gone, and many of its charms with it; but still it is well worth the attention of the traveller, as one of the most
uncommon

uncommon pieces of scenery afforded by this coast.

At the southern extremity of the barony of Glenarn is the town of Larne, formerly called Inver, which, in both the Scotch and Irish dialects of the Celtic language, signifies low, or the confluence of waters, and is truly descriptive of its situation. It lies eighteen miles north of Belfast, at the entrance of Larne lough, anciently Olderfleet from a castle situated at the extremity of the peninsula, which forms the small bay close to the town. History and tradition are silent respecting the building of this castle; but it is supposed to have been the work of the Scotch family of the Bissets, who according to Camden were in possession of that part of the coast; and it probably was afterwards improved by the English. In 1559, Sir Moyses Hill was governor of it, and in 1603 James the 1st granted the peninsula* to Sir Randal Mac Donald called Sorley-buy. The castle and lands were afterwards granted by James 1st, in the 10th of his reign, to Sir Arthur Chichester, and the right of ferry between this place and Island Magee. It was here that Edward Bruce landed in the spring of 1315, from a fleet of barks, 6,000 men, which being joined by the

3a

Irish

* This peninsula is called the Curran, which is said to signify, in Irish, a hook, and is expressive of its figure.

Irish committed great ravages upon the English settlers. Larne consists of an old and new town; the latter chiefly of one long street, well built of stone, the houses of which have a great air of neatness; in the old town the houses are mostly decent, but the streets and lanes are narrow, crooked, and badly paved, which gives it an indifferent appearance. By accounts taken in January 1808, the number of dwelling houses in both parts were 421 containing 463 families, and 2512 persons, 1120 of whom are males, and 1392 females, which is only $5\frac{3}{4}$ to a house. But by an account just sent to me from a gentleman, on whose accuracy every dependance may be placed, the present state of the population taken by the houses is as follows. Inhabited house 449, many of them containing two, three, four, and even five families each, which this informant finds to add 35 families; the total families then must be 484, which, taken at $5\frac{3}{4}$ to a family, the result of the first enumeration, makes the total 2783, being an increase, since January 1808, of 271. Here it seems proper to observe that, in calculating the inhabitants of a town where the houses also are given, it is necessary to allow more for each house than in the country, both from their containing, many of them

them, more than one family, and also from the domestics; but, when families are given, there is reason to suppose them to contain more persons in each than country families, except as in the case of Larne, where they have been individually counted, as it is understood to have been the case in the enumeration of 1808, and the fact found as is stated.

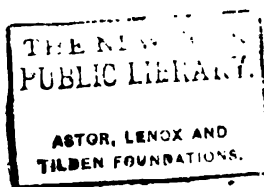
Larne is a place of some trade, and the residence of a collector; the duties amounted to £14,000 last year, and, though there are other importations, the principal is rock salt, as this is manufactured very extensively; there is also a sail-cloth manufacture, some rope-making, and tanning of hides. But the principal is weaving cotton. In the town are two book clubs; the gentlemen's club is extensive and well chosen, the other also contains some valuable works.

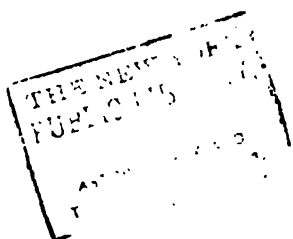
Markets are held on the first Monday of each month for linen, yarn &c. and fairs on the 31st of July, and 1st of December; a very great flour-mill was sometime ago erected close to the town. The places of worship are an established church, three dissenting meeting-houses, one catholic and one methodist chapel.

In the barony of Belfast are the villages of Ballynure, which contains about 50 houses; Straid, a
small

small place to the east of the former, on the verge of the Liberties of Carickfergus; Ballycarry, opposite to Island Magee in a commanding situation, just above the improvements of Red Hall; Templepatrick which consists of about 30 houses, and lies to the south of the Six-mile water, four miles to the east of Antrim, and might be a pretty spot. The situation of Dunmurry, on one of the roads leading from Belfast to Lisburn, has many beauties; the hills around it, ornamented with planting, are strikingly beautiful; and, though it lies low, it is dry, the soil being mostly a sandy or gravelly loam; upon the whole it is one of the most charming sequestered, though small, districts which this country affords. Nearly the whole of the Malone road from Belfast to Lisburn is a village, the houses, except where a gentleman's place intervenes, being within call of each other; but, a mile to the north of Lisburn, a few houses placed more closely together entitle Lamberg more particularly to the name.

Carickfergus and its Liberties, though within the precincts of the barony of Belfast, form a county distinct from Antrim, having their own assizes; the assizes for the whole county are also held there. It is situated on the bay, to
which





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which it gives its name, and lies about eight miles to the north of Belfast. From the gateway at the entrance next Belfast to the main street it is narrow like all old towns, especially those that were fortified, when in turbulent times people crowded for protection. The centre of the town, at one end of which the Court-house stands, is spacious; and the row of houses, which are called the Scotch quarter, and the part leading to it are particularly well placed fronting the sea; there is another portion, which also lies out of the walls, called the Irish quarter; these parts have long been thus distinguished, from the residence of their different people.

The old walls of the town are in some directions still in existence, and the castle, which stands on a rock projecting into the sea, was in 1794 thoroughly repaired, and cannon mounted in its batteries; since that time it has served as the principal depot for arms and ammunition for the district. Formerly Carrickfergus was a place of considerable trade, from possessing the privilege of importing merchandize at one third of the duties payable in the rest of the kingdom; but this immunity was purchased from them by the Earl of Strafford in 1640 for £500, and the trade was immediately transferred to Belfast,

Belfast. The Mayor however has jurisdiction over the bay, and issues attachments against ships and cargoes, or against persons on board the ships, for debts contracted any where. This jurisdiction extends from Beer-house, county of Down, to Fair Foreland, county of Antrim, Bangor and the pool of Carmoyle excepted. The boundaries of the lands belonging to the corporation are nearly square, extending about four miles each way; in this corporation they are invested by charter, granted by Elizabeth, and confirmed by James the first; all these lands are let except about 1500 acres, which are used by the freemen as a common. By this charter the government of the town is vested in a Mayor chosen annually, a Recorder and two Sheriffs, seventeen Aldermen and twenty four Burgesses; it also gives the power of admitting freemen, whose present numbers are about 1100.

Where the Court-house and jail now stand, there was a noble house belonging to the Donnegall family, built in 1610 upon the site of a Franciscan monastery, which, on the suppression of religious houses, was granted to Sir Edward Fitzgerald, who afterwards assigned it to Sir Arthur Chichester. The church is an ancient building in the form of a cross, dedicated to
St.

St. Nicholas ; in the north aisle is a monument of the Donegall family ; at the bottom is the figure of Sir Arthur Moyle, their ancestor, on his knees, and without hands, which he is said to have lost in Spain, whilst fighting against the Moors. The east window is of stained glass, representing St. John baptizing in the river Jordan ; it was presented to the parish by Mr. Burleigh.

Some years ago a considerable sum of money was laid out on the quay, which is thought not to have been attended with as much advantage, as might have been expected ; nevertheless it is of service to the shipping, which are mostly coal and fishing vessels. The fishery in the bay employs many boats and men, who mostly inhabit the Scotch quarter ; the first taken are the several flat kinds, as well as cod, ling, haddock, red and grey gurnard, and remarkable fine oysters, which are taken nearer to Bangor than to this town. Mackerel is sometimes taken, and herrings ; but the resort of these fish is uncertain. In spinning and weaving of cotton many hands are employed ; in the latter branch the number is 157 ; of linen weavers there are only 24. Much leather was tanned in this place, but it has fallen off as in other parts.

In

In 1797 the number of houses in Carrickfergus was 452; in 1800, from the returns made to government, the number was 475. And in 1808 it was 487, the number of inhabitants 3400, which makes seven to a house.

In point of population, therefore, this town is the third in the county, Lisburn being next to Belfast. I shall close this account of Carrickfergus with an extract from a Survey by Geo. Clarkson in 1567.

“ The building of the said castle on the south part is three towers, viz. the gate-house, tower in the middle thereof, which is the entry at a draw-bridge over a dry moat, and in said tower is a prison and porter lodge, and over the same a fair lodging, called the constables lodging; and in the courtain between the gate-house and west tower in the corner, being of divers squares called Cradyfergus, is a fair and comely building, a chapel, and divers houses of office, one on the ground; and above the great chamber, and the Lord's lodging, all which is now in great decay, as well in the coverture being lead, as also in timber and glass, and without help and reparations it will come to utter ruin*.

The

* For the antiquities of Carrickfergus, the reader is referred to the chapter on that subject. For the first account of the popula-

The following account of the establishment of Moravian brethren of Ballykennedy was furnished, some time ago, by the respectable head of the society there; the plain and unaffected history of the settlement of this respectable body cannot fail of being pleasing to the reader; and it is only justice to say of them, that the religious and moral conduct, the inoffensive manners, and industrious habits of the lower orders make them a valuable example to their own class in the neighbourhood, whilst the acquirements of those in the higher stations are a no less valuable acquisition, especially since they have turned their minds to the education of youth of both sexes, for which their mode of life seems particularly adapted; and the great order, with which the whole system of the society is conducted, also seems to be admirably calculated to impress young minds not only with sentiments of piety, but with respect for their teachers and a love of regularity and method.

3 R

Grace-hill,

tion of Larne, and for that of Carrickfergus, the writer is indebted to Mr. Mc. Skimin, who has published the Statistical Survey of the county and town of Carrickfergus, and also for other particulars published by the same in the Belfast Magazine.

Grace-hill,

Is a settlement of Moravians, or United Brethren, on the townland of Ballykennedy, two miles from Ballymena, one from Ahoghill, and six from Randalstown. The townland is held under Lord O'Neill, on a lease of lives renewable for ever, and consists of 215 acres, three roods, most of which is divided into small parcels of three or four acres, and thus let to the inhabitants.

The village itself is situated near the river Main, opposite Gilgorm, with which it is connected by a bridge of four arches.

It was begun to be built in the year 1765, and contains, besides the chapel and the principal buildings, called the Brethren's house and the Sisters' house, fifty-three family houses, most of which are, however, small cottages.

The larger buildings constitute three sides of a square, open to the north-east, the interior of which is surrounded by a double row of trees, and contains a fish-pond, and a shrubbery in the centre.

The Sisters' house is a lodging and boarding-house for single women belonging to the society,
and

and has at present about sixty inhabitants, who support themselves by different kinds of needle-work, particularly tambour, knob-work, and embroidery, which is much admired; as also by lace-making, plain-work, mantua-making, &c. the profits of which, though erroneously supposed to belong to the community, are the sole property of the individuals engaged in them. The dormitory and prayer hall attract the notice of strangers by their superior neatness and cleanliness.

The Brethren's house, on the opposite side of the chapel, is nearly of the same size as the former; but, the inhabitants having decreased in number, the greater part of the building is devoted to an academy for young gentlemen, instituted about two years ago, and conducted by the minister of the place and several assistants. The number of pupils is at present about thirty, who are instructed in the classics, mathematics, and other more usual branches of general education.

There is also a boarding-school for young ladies, which has subsisted nine years, and is under the direction of Miss Steinhauer, a lady of very superior abilities. There are seldom less than sixty pupils in the school.

Besides the above, there are two day-schools, much frequented from the neighbouring country;
the

the girls' school having sometimes eighty, and the boys' school twenty scholars.

Formerly the linen manufacture was considerable in this village, but at present there are not more than eighteen looms at work.

There are four carpenters, who employ about twenty hands, and supply a considerable district with furniture, looms, clock-cases, &c.; two shoemakers, who also employ about twenty hands; two stocking-weavers, employing seven frames; besides a baker, butcher, and taylor.

There is also a considerable country shop here, which, besides many other articles, supplies many shop-keepers round about with earthen-ware imported from England.

The number of inhabitants, at the close of 1806, was,

Males above 12 years of age	79
Females ditto	169

248

Males under 12 years of age	54
Females ditto (including boarding-school)	93

Total of inhabitants	395
----------------------	-----

There

There are, upon the townland, 86 cows and heifers, and 11 horses.

Most of the fields are well enclosed with flourishing hedges and trees; and the land, which consists mostly of a light loam, is well cultivated, though the small size of the farms does not admit of any of the modern improvements in agriculture on an extensive scale. One of the inhabitants has reaped considerable advantage from the cultivation of camomile, and other medicinal herbs. He has produced in a year eight hundred weight of camomile flowers on three roods, which sold for £40 sterling.

The present flourishing condition of the townland forms a striking contrast to the state, in which it was, when first occupied by the Moravian brethren. There were then only twelve families upon it; no fences were to be found; a few furze bushes diversified the dreary scene; cattle were frequently bogged in the low grounds.

Such have been the changes effected by industry, sobriety, and good morals, resulting from religious principle.

The Moravian brethren, as a religious community, do not differ, as to doctrinal points, from the tenets of the church of England, but their discipline and church government is peculiar to themselves.

selves. The first preacher of this society, who came to Ireland, was John Cennick, who was invited over to Dublin from England, in 1746, by some persons, who had heard him in London. In the same year he was invited to Ballymena; since 1748 he spent some part of the year, for seven years, in the counties of Antrim, Derry, Armagh, and Tyrone; and, being much followed, he formed several societies in different parts, which were afterwards supplied with ministers from England and Germany. But in the year 1765 it was thought desirable to form a settlement, in which such members of the society, as approved of it, might live together in one place, and regulate their polity according to their peculiar tenets. In consequence, a number of families from the neighbourhood, and about five or six foreigners, moved to this place. The number of Moravian brethren in the county of Antrim may amount to nearly one thousand, scattered through different parts of the county.

The village contains a very comfortable, though small inn, neatly kept by one of the society.

The burial ground deserves particular notice, as it lies at a *distance* from the place, and is planted with rows of trees. The situation of it is high and airy, unlike many others, which lie low, and are surrounded with the habitations of the living.

SECT.

SECT. 9. *Schools, State of Education.*

At Ballycastle there is a school, many years ago endowed by Mr. Boyd, with a house and twenty-four acres of land, which is now assisted by the funds set apart for such purposes. Sixty girls are there maintained, clothed, and educated. This, the diocesan school, and Quakers' school at Lisburn, are the only institutions that have endowments.

Of private schools there are a few of considerable character, exclusive of those of Belfast. At Crumlin is an academy, of which the Rev. Nathaniel Alexander is the principal, for finishing boys either for the learned professions, or for the counting-house. At Carrickfergus there is a seminary upon a similar plan, under the direction of the Rev. And. O'Beirn; one at Grace-hill, already noticed; one at Lisburn, by Mr. Hudson; and, in various places the classics (as well as the English language grammatically) are taught in schools of minor eminence, where those, who wish to qualify themselves for professions or situations in life above their present circumstances, may have access to learning upon easier terms than the first-rate seminaries can

can afford: and it is not uncommon for a few opulent farmers and others to engage young men, in the recesses from the Scotch colleges, to instruct in their respective families. In this mode of alternate teaching at home (to acquire funds) and of learning abroad, by means of what they have acquired, many young men of abilities and application have brought themselves forward to situations by them otherwise unattainable.

But the chief source of instruction to the people arises from the parochial schools, properly so called, and from others of like description, where the rudiments of the English language, together with writing and arithmetic, are taught, and, in many instances, the less complex branches of mathematics. In general, one master is totally inadequate to the instruction of a parish; and one house no less so, not more from the numbers, than from the distances; few parishes, therefore, are without some supplementary place of instruction. Many free-schools are supported in different quarters, and are daily increasing by the exertions of the higher classes. But, without entering into the particulars of these meritorious works, it may be safely said, that in them there is every disposition to take advantage of the benefits thus liberally held out to them, so far as the daily occupation of earning their
their

their bread will allow; therefore, the plan of having Sunday-schools for the instruction of such persons must be attended with particular circumstances of advantage, as they do not interfere with their necessary daily occupations; and this employment prevents idleness from leading them into improper conduct on that day, which is particularly set apart for informing them in their duty. The prices of teaching in country schools are moderate; for spelling and reading, from 3s. 3d. to 6s. 6d. per quarter; with writing, from 4s. 4d. to 6s. 6d.; with arithmetic, from 5s. 5d. to 8s. 1½d. Mathematics, 11s. 4½d. per quarter—Latin, &c. about the same.

SECT. 10. *Language of the Inhabitants, Cloathing, Use of Spirits or Beer.*

All speak English; and the descendants of the first Scotch settlers speak also a dialect of the Celtic, said to be a mixture of the Highland language and that, which the ancient Irish inhabitants spoke; but it is not easily understood by those, who speak either Erse or Irish well. The descendants of the Lowland Scots still retain the accent of their original country, though it is not so strong as it formerly was; and the English

colonists have in many instances acquired it, where the intercourse is frequent.

In this part of Ireland the every-day cloathing of the people is generally comfortable, and often neat; but whoever wishes to see them to advantage must choose Sunday, when they are going to, or returning from their respective places of worship. The men in their substantial cloth coats, striped waistcoats, corded breeches, and white stockings, make a very respectable appearance; and the women mostly arrayed in white, since the introduction of cotton, form a very cheerful scene. The women might be thought too well dressed for their station, was it not known to be the fruits of their industry, and, to procure it, often an incitement to exertions.* The manufactures of the country, by giving employment to the females at an early period, contribute much to this appearance, by enabling them to afford something to the general stock, not leaving the labouring oar entirely in one hand†.

Both

* That the women are good economists, cannot be denied by those, who have seen them walk barefooted, carrying their shoes and stockings, until they approach the place of their destination—shoes and stockings, however, are not so much dispensed with as they were.

† A curious circumstance, connected with the cloathing of the lowest orders here, must not be omitted; that is, the great quantity

quantity

Both spirits and beer are much used, and scarcely any bargain is concluded without a portion of one or the other; yet, drinking to excess is not by any means common; nor are the fairs and markets disgraced or interrupted by such riots as formerly. The comparative consumption of beer had increased whilst whiskey was so high in price; and it is much to be wished, that it may become the favorite beverage of the people, as its qualities are neither so inflammatory, nor so hurtful to the mind or body, as those of the former. Though the number of distilleries is much diminished, and of breweries much encreased, spirits from the great manufactories in the capital always find their way; and, notwithstanding the duties are lowered, the produce of unlicenced stills continues to be distributed. In so populous a country as this the consumption must be great, even without drunkenness, a vice (and it is with pleasure I repeat it) that appears, even in despite of the dangerous experiment made, to be daily losing ground.

SECT.

tity of second-hand clothes, many of them very good, imported from Scotland, and sold in all our markets. Why are they not worn out at home?

SECT. 11. BELFAST,

*Its former and present state, population, trade,
literary and charitable institutions, &c.*

BELFAST is situated on the western side of the Lagan, in latitude $54^{\circ} 35' \frac{1}{4}$ north, and in longitude $5^{\circ} 46'$ west of London, where that river runs into the southern extremity of Carrickfergus bay. Near the present bridge was formerly a ford at low-water, and a ferry when it was high tide. It is supposed to have derived its present name from *Bela Fearsad*, which signifies a town at the mouth of a river, expressive of the circumstance, in which it stood.* This estuary, indiscriminately called Carrickfergus bay, or Belfast lough (and probably the Vinderius of Ptolemy) is a most safe and commodious harbour,† the entrance being in breadth about five English miles, from the point between Groomsport and Ballyholme bay, in the county of Down, and the White Head in the county of Antrim. The length of the bay, from the White Head to the quays,
is

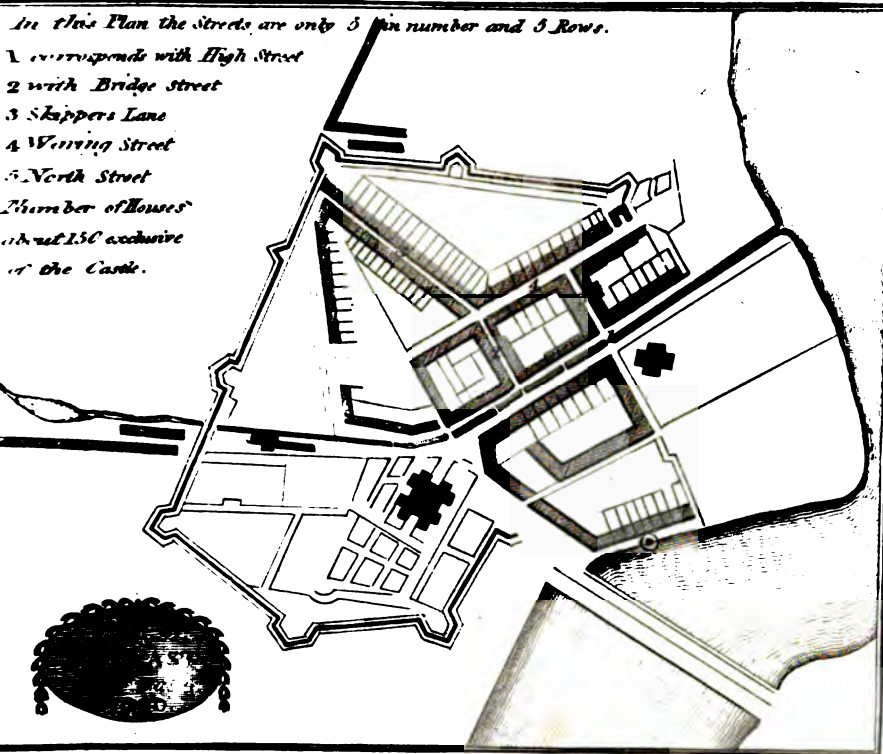
* In the Carrickfergus papers it is stiled the Fords of Belfast.

† Lawson's Survey of the Lough of Belfast.

In this Plan the Streets are only 5 in number and 5 Rows.

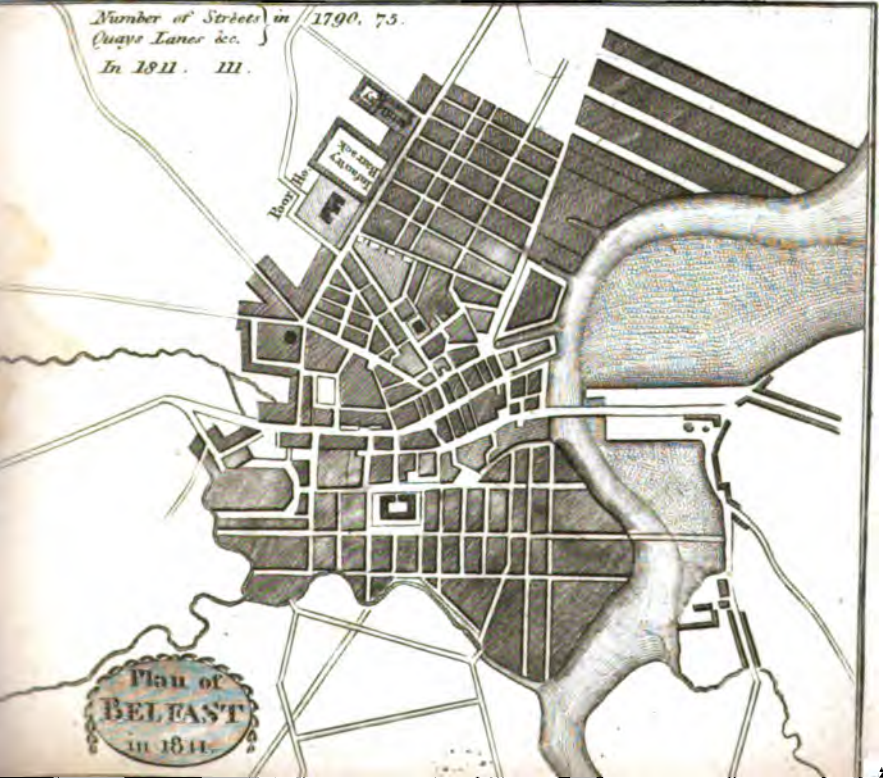
- 1 corresponds with High Street
- 2 with Bridge Street
- 3 Skippers Lane
- 4 Waring Street
- 5 North Street

*Number of Houses
about 150 exclusive
of the Castle.*



It will be immediately perceived that these Plans are not on the same Scale.

*Number of Streets in 1790, 75.
(Quays, Lanes &c.)
In 1811, 111.*



*Plan of
BELFAST
in 1811*



is about twelve miles, gradually growing narrower as it approaches the bridge, where it is much contracted by the different landing-places on the one side, and the embankments of Ballymacarret on the other. Formerly, at full sea, there was not more than from eight to nine feet water at the town; now, the depth is so much increased by the judicious management of the Ballast-office, that vessels, which draw thirteen feet, can come close to the wharfs.

The highest mountain * in the county, which lies to the west of the town about two miles, and the other mountains that come in to the north-west, conjointly with the high lands of the county of Down to the south-east, render it one of the most sheltered retreats for shipping in any part of the world; the width of its entrance giving an easy access from the channel, in different directions; and, the anchorage being excellent, few accidents occur. At the pool of Garmoylet† vessels ride afloat at low-water, though, within a cable's length, all is dry around. This pool is about one mile and a half from the Antrim shore, one mile from that of Holywood, and near five miles from Carrickfergus.

* Divis.

† The place of heaps of fish.

rickfergus. In the channel pillars have been erected, and buoys have been placed, to direct the mariner, at high-water, through its various windings.

Although Belfast is mentioned by Spenser as having been wasted by Edward Bruce in his progress, at the beginning of the 14th century, it is not taken notice of by the old English writers, who enumerate the haven towns of the north of Ireland at an early period.* Of the building of the castle there is no date known, though it was twice taken by the Earl of Kildare, first in 1503, again in 1512. Before the reign of Elizabeth it was inhabited by a Randolphus Lane; and in the manuscript account of the county of Antrim, which is published with this work, and was written in 1598, it is mentioned as being then fordable, and lying eight miles up the river from Carrickfergus, where the passage is over it at low-water. By Elizabeth it was granted to Sir Thomas Smith, and to Thomas Smith the younger, with a vast tract of land, on condition that they should keep a certain number of horse and foot, harnessed and accoutred, to be ready in a certain number of days, after being required, to meet at
Antrim.

* Neither by Marlborough nor Clarkson:

Antrim. When Sir Arthur Chichester was Lord Deputy, in the reign of James the first, such a summons was issued, and, neither appearing, the castle and cinament (demesne) of Belfast were forfeited, and granted to Sir Arthur. The charter, constituting Belfast a corporation, of a sovereign, twelve burgesses, and commonalty, with the privilege of sending two members to Parliament, was also granted by James I. in the fifth of his reign, constituting Arthur Lord Chichester, his heirs, &c. Lords of the castle. Thomas Vesey, the first sovereign, was chosen in 1613; and in the same year, Sir John Blennerhasset, baron of the Exchequer, and George Trevillian, Esq. were the first members sent by this town to Parliament. At that time Belfast could not have been considerable; for, in the patent, it is stiled town, or village. In the year 1635, mention is made of Lord Chichester's house there by an English traveller, who stiles it "the * glory and beauty of the town;" but nothing of the town is said, except that "many Cheshire and Lancashire men were planted in the neighbourhood by Mr. Arthur Hill, son of Sir Moysey Hill;" Belfast itself at that time being peopled with Devonshire men, and a number of the Scots who came in the former reign.

In

In 1640, Lord Strafford purchased from the corporation of Carrickfergus, on the part of the crown, their privilege of importing foreign goods at one-third of the duties payable in other places; being deprived of this advantage, Belfast rose at the expense of the former, from whence the custom-house was removed to it about the same time. This measure, of itself most judicious in Lord Strafford, would have been of small consequence, had not the country already been inhabited by an industrious people, who applied themselves to agriculture, and to the manufacture of linen, which, by their profits, enabled them to create a demand for articles of importation. A port, without a population near it, is of little importance. The wars, which ensued subsequent to 1741, must have caused a great interruption to the rising prosperity of Belfast, and the adjacent counties; and, in 1648, it was taken possession of by General Monk for the Parliament.

During the Protectorate the country seems to have been tolerably quiet, but in the reign of James II. it again met with some interruption; and he endeavoured to force a new charter upon the corporation, which, from its attachment to William III. was never acted under. But, from the
day

day, in which this latter monarch gave peace to the country, and that attention was paid to its interests by the encouragement afforded to the already established manufacture of linen, a wonderful fabric of prosperity was raised; and, in the beginning of the last century, we find Belfast not only well known on the continent, as a place of considerable trade, but in a scale of credit appended to the names of the different commercial towns of Europe; in the Exchange at Amsterdam, Belfast stood in the first rank, which respectable situation it has, since that period, continued to occupy, and, from the credit annexed to it, joined with judicious enterprize, it has arisen to a degree of prosperity, in a course of years comparatively short, seldom exceeded, and not often equalled in any age or country.

Population.

The first account of the population of Belfast, that could be obtained, is that published in one of Mr. Robert Hyndman's lists (but by whom it was taken it is not said);—by that account it appears to have contained (Jan. 1, 1758) 1779 houses, 8519 inhabitants. From an accurate account,

taken by Mr. Hyndman himself, when High Constable, it contained (Jan. 1, 1782) 2026 houses, 13,105 inhabitants. By this it appears, that the population increased, in fifteen years, above one half. In 1791, from a second enumeration by Mr. Hyndman, the numbers were 3107* houses, the inhabitants 18,320, an increase in less than ten years, of 1081 houses, and of inhabitants, 3515; and, from the difficulty of obtaining exact information, the population is supposed rather above than below these returns.

From a most accurate survey made by Mr. Arthur Thomson, in 1807, the houses were 3514, the inhabitants 22,095, being in eighteen years an increase of 407 houses, and 3735 inhabitants. It has not been ascertained, what are the numbers of the present day; to all appearance, there has been a considerable addition within the last four years; the supposition is, they amount to 26,000, or thereabouts.

From the ancient plan, which accompanies this, (but in what year taken is uncertain) the town then contained only six streets, and four rows of houses. From a survey made in 1808, it was found to contain
squares

* It is curious, that the Government returns, in 1800, only make the number of houses 3053, of which 1568 were exempt from window-tax.

OF THE COUNTY OF ANTRIM. 507

squares, streets, quays, lanes, and entries, to the number of one hundred and fourteen. In 1791, their number was only seventy-five, being an increase, in seventeen years, of thirty-nine.

To the general account of the rise of population in Belfast I have added a copy of the lists, on which it is founded; they are curious documents, well worth preserving.

*Number of inhabitants in the town and suburbs
of Belfast, taken January 1st. 1782 by Mr.
Robert Hyndman, then High Constable.*

2026 houses, containing	{	6132 males.
	{	6972 females.

In all 13,105

There are also in town 388 looms, mostly employed in the cambric, lawn, and cotton branches; 13 stocking-looms; 1 hair-loom; 4 carding machines; and 25 spinning jennies for cotton; the number of the latter daily encreasing. Out of the above, there are the following number of each trade.

Butchers

508 . STATISTICAL SURVEY

Butchers	-	87	Sadlers	-	14
Bakers	-	40	Sawyers	-	26
Barbers	-	28	Smiths	-	78
Coopers	-	163	Staymakers	-	6
Carpenters	-	68	Tailors	-	65
Cabinetmakers	-	22	Tanners and Curriers	-	33
Chandlers	-	27	Weavers (one of them		
Hatters	-	18	a female)	-	389
Hosiers	-	7	Watchmakers	-	14
Masons	-	48	Wheelwrights	-	9
Nailors	-	27	Sundries of other trades		166
Painters	-	9	Tobacco-spinners, giving employment to		
Ropers	-	20	152 children of both		
Reedmakers	-	6	sexes.	-	38
Shoemakers (two of them females)	-	224			

Publicans under licence for spirits and strong beer, being one to every sixteenth house, - 119

By the above it appears, that the town and suburbs are increased since Jan. 1st. 1758, being 15 years, nearly one half; the following being the then state of the same:

1779 houses, containing	{	7993 Protestants.
		556 Roman Catholics.

8549

There

OF THE COUNTY OF ANTRIM. 509

There were at that period 399 looms, and 1800 people able to bear arms.

Increase in houses is 249

Ditto, in inhabitants 4556

Number of inhabitants, &c. in the town and suburbs of Belfast, taken at Midsummer 1791, by the same person.

Houses occupied 2909

Ditto, uninhabited,

chiefly new - 198

3107 containing	}	8932 males.
		9388 females.

In all 18,320

Looms employed at cotton - - 522

cambric and linen - 129

sail-cloth - - 28

stockings - - 16

Total - - 695

There are 229 spinning jennies, from 25 to 100 threads, which draw 15,273 threads, or nearly 67 on an average. Out of the above, there is the following number of each trade, &c. viz.

Butchers

Butchers	-	39	Reedmakers	-	6
Bakers	-	67	Shoemakers (2 females)	312	
Barbers	-	30	Sadlers	-	22
Chandlers	-	29	Sawyers	-	37
Coopers	-	115	Smiths	-	69
Carpenters		169	Staymakers	-	15
Cabinetmakers	-	40	Tailors (one female)	100	
Hatters	-	38	Tanners and Curriers	45	
Hosiery	-	16	Weavers (six females)	679	
Masons	-	68	Watchmakers	-	22
Nailors (one female)	41		Wheelwrights	-	6
Painters	-	17	Sundry other trades	220	
Ropers	-	35			

Tobacco-spinners give employment to 20 children of both sexes.—Decrease in nine years and half, including children employed, 165; the consequence of impolitic revenue laws.

Publicans under licence for spirits and strong beer, being one to every 17th house, a great number of these persons who have trades, 167.

By the above it appears, that the town and suburbs are increased in less than ten years.

Houses	1,081
Inhabitants	5,215

OF THE COUNTY OF ANTRIM. 511

As Ballymacarret is only separated from the town of Belfast by the long bridge, the following view of the progressive improvement is given.

In 1781.			In 1791.		
Houses	-	96	Houses	-	276
Males	-	195	Males	-	596
Females	-	224	Females	-	612
<hr/>			<hr/>		
Total		419	Total		1,208

Mr. Arthur Thomson's account, taken 1807.

It will be necessary to give limits to Belfast, that its extension may be better understood. The following appears to be the present boundaries of the town: to the first arch of the long bridge on the county of Antrim side; to the Mile-water bridge on the Carrickfergus road; to the porter's lodge on the road leading to Old Park, and around by the path-way to the back of the Poor-house; to Mussenden's hole on the Lodge road; to Craven's bridge on the Shankhill road; to Reid and Cavert's factory on the Falls road; to G. Bradberry's house on the Pound-fields road; to the Salt-water bridge on the Malone road; and to the houses at the bank on the side of the wooden bridge next Belfast.

The

The houses inhabited within these precincts are

Houses of one story	808
two stories	1801
three do.	869
four do.	36

Total of inhabited houses 3,514

There are also eighteen places, called cellars, inhabited.

The male inhabitants of these houses,

ten years and upwards, are	7213
Female inhabitants, ditto	- 9227
Males under ten years of age	- 3011
Females, ditto	- 2644

Aggregate of inhabitants 22095

New houses finished, and excepting sixteen ready for tenants.

1 story high	2
2 do.	92
3 do.	27
4 do.	10
5 do.	3

134

Houses

OF THE COUNTY OF ANTRIM. 513

Houses formerly inhabited, but now untenanted and waste.

1 story high	-	29
2 do.	-	97
3 do.	-	69
4 do.	-	3
<hr/>		
Total waste	-	198
Total new untenanted	-	134
Houses inhabited as above		3514
<hr/>		
Total of houses	-	3846

The different kinds* of looms, employed in Belfast, are as follow :

Cords, calico, and muslin looms,	629
Linen do. - - - -	4
Sail canvas do. - - - -	35
Sacking do. - - - -	5
In a new manufacture, called Win-	
dow woollen cords, by Mr.	
Buckly from England	5
<hr/>	
	678
Unemployed looms	45
<hr/>	
Total of looms	723

S U

Taking

* Thirty-five of those looms were wrought by females — they seemed to be quite at their ease, and drove the flying shuttle with great dexterity.

Taking the numbers employed on the above looms, the cotton trade gives employment to 2108 inhabitants of this town. It is well worthy of remark that, at 45 years from this date, the whole of the looms in Belfast were linen looms, except a few that wrought blue and white check handkerchiefs, and four diaper looms in the employment of the late Wm. Haven Esq. The whole of this arduous task of numbering the inhabitants of Belfast was accomplished, under the most unwearied and much personal investigation, in the course of 26 days, by Mr. Arthur Thomson, who, except in one or two instances, met with no opposition. He, however, found means to ascertain the numbers in those families, who refused the required intelligence.

Trade of Belfast,

Rapid as the progress of population has been in Belfast, commerce has fully kept pace with it. From Mr. Young's account, whose information was obtained from the most authentic sources, and which was written in the year 1776, it appears that the gross customs, including excise, in 1763 amounted only to £32,900; in 1770, which

OF THE COUNTY OF ANTRIM. 515

which at that period was reckoned its best year, they amounted to £63,600, nearly double in seven years; from that date they fell until 1775, when they were somewhat more than in 1770, being £64,800. But great was the increase after the American war; for in 1784 the gross customs, exclusive of the excise, amounted to £101,376. From that time, with some fluctuations for bad years, there has been a gradual rise; much of this rise has certainly been owing not only to the additional quantities imported, but also to the additional duties; to how great an amount they are now arrived, the following corrected return of the customs, for the last ten years, will show.

	Yrs.	£.	s.	d.
Year ending Jan. 5th, 1802	-	182,314	5	11½
1803	-	270,434	7	1
1804	-	201,180	4	9½
1805	-	207,402	6	2½
1806*	-	223,645	5	1½
1807	-	207,382	17	5½
1808	-	320,981	8	9½
1809	-	318,121	12	5½

* Since 1806 another district has been added to Belfast; therefore taking it in would not assist the comparison.

	Yr.	£.	s.	d.
	1810	-	425,174	18 2½*
Year ending Jan. 5th, 1811	-	320,804	5	2

If to the customs the excise is added, the difference from 1763, being 48 years, is enormous. Excise of Lisburn district, which includes the excise of Belfast, for three years:

	Yrs.	£.	s.	d.
1804	-	48,490	14	1½
1805	-	34,490	8	9½
1806	-	60,396	4	1½

The progression of the customs having been stated, a list of the principal of those importations, from whence they are chiefly derived, naturally follows; and, as these are taken from the accounts published weekly, they may be considered authentic so far as they go. They are for the years 1809 1810; the amount also of the exports for 1809, is given, and the amount (with the particulars) for 1810.

Accounts

* The rise in this year was owing to the falling off in the distilleries, and the rise of the duties on foreign Spirits.

OF THE COUNTY OF ANTRIM. 517

Account of the foreign goods imported at Belfast direct and indirect for the year 1809.

14166 bales cotton wool	226 Do. pearl ashes
881 barrels rosin	63 bags ginger
186 casks madder	257 bags
2349 hogsheds	49 casks } pimento
634 tierces	80 hogsheds } Genera
596 bags	220 pipes
86 cases	484 casks smalts
663 casks } coffee.	6515 chests of tea.
351 bags	978½ hogsheds leaf tobacco.
139 pipes Teneriffe	311 bales miserable
5 Do. Lisbon	40 chests cocoa
115 pipes	2950 puncheons } rum
20 hogsheds } Port wine	456 hogsheds
120 quarter casks Malaga	2620 bundles cane seeds
16 pipes	14082 bushels bay salt
1 hogsheds } Madeira	582 casks rice
570 pipes } Spanish red	8520 casks } flaxseed
2 hogsheds } wine	3995 bags
5857 bales } Allcant barilla	952 cases liquorice ball
90 casks	198 pipes brandy
600 tons Sicily barilla	2097 bundles flax
95 Do. Teneriffe do.	439 bundles hemp
330 Do. Sardinia do.	440 casks tallow
4290 barrels potash	46 casks Spirits turpentine
485 Do. Dantzic ashes	849 barrels tar
	828 Do. turpentine.

Imports

Imports for 1810.

12481 bales cotton wool	206 cases liquorice ball
1132 barrels tar	79 casks } ginger
820 Do. rosin	115 bags }
598595 staves	3500 hogsheads }
1485 hogsheads tobacco	566 tierces } sugar
598506 deals and deal ends	932 barrels }
981 puncheons } rum	58 bags }
240 hogsheads }	254 pockets } hops
4091 pieces American timber	5981 chests tea
3111 Do. Norway do.	118 hogsheads claret
798 Do. Swedish do.	241 pipes } Port wine
1010 boxes Sicily soap	132 hogsheads }
159 tons brimstone	8 butts Sherry
3862 bales Alicant barilla	16 pipes Madeira
145 tons Sicily do.	226 pes }
2153 bales liquorice root	20 hogsheads } Spanish red wine
93 bales cocoa shells	174 casks olive oil
2917 bundles cane reeds	457 bundles hemp
1742 bales } tallow	2382 Do. flax
298 casks }	5347 bars iron
3895 barrels potash	551 barrels turpentine
729 Do. pearl ashes	326 casks }
2066 Do. weed do.	126 barrels }
4368 hogsheads }	290 casks fish oil.
6574 barrels } flax-seed	
1024 bags }	

Though this list must be correct as far as it goes, many articles are surely omitted.

Aggregate

OF THE COUNTY OF ANTRIM. 519

*Aggregate account of the principal Exports
from Belfast, of Irish produce and manu-
factures during the Year 1810.*

			£	s.	d.
Linen	15,152,831 yards	-	Value 2,272,924	13	0
Butter	51,547 firkins	-	280,414	10	0
Soap	3,239 boxes	-	6,478	0	0
Tongues	1,884 kegs	-	3,297	0	0
Oatmeal	130 tons	-	2,340	0	0
Hides	8,137	-	16,274	0	0
Linen yarn	800 Cwt.	-	12,000	0	0
Oats	3,822 do.	-	1,911	0	0.
Bacon	63,561 do.	-	206,573	5	0
Cotton yarn	17,927 lbs.	-	4,942	6	0
Wheat	821 tons	-	16,420	0	0
Pork	17,093 barrels	-	91,191	0	0
Candles	961 boxes	-	3,344	0	0
Beef	8,280 barrels	-	37,260	0	0
Calf-skins	1,851 dozen	-	5,553	0	0
Potatoes	491 tons	-	1,482	0	0
Cotton	26,601 yards	-	1,695	1	6
Tan. leather	44,011 lbs.	-	4,401	2	0
Muslin	60,500 yards	-	6,050	0	0
Feathers	297 Cwt.	-	2,703	14	0
Rags	155 tons	-	4,650	0	0
Calico	410,182 yards	-	25,636	7	6
<hr/>					
Total value of Exports in 1810	-		2,904,590	19	0
Total value in 1809	-		2,367,271	3	3
<hr/>					
Increase in value of Exports in one year	-	£	537,319	15	9
					After

After this view of the commerce of Belfast, the shipping interest, and the different trades, in which the vessels belonging to it are and were employed, come to be considered. I shall therefore give an account of the circumstances, in which this business stood in the year 1785, as well as at the present day.

Shipping of Belfast, 1785.

<i>Foreign Trade</i>	<i>Ships</i>	<i>Tonnage</i>
America (7 of these to Virginia)	15	4,810
West Indies	12	2,060
Rotterdam	2	300
Streights	1	300
Bourdeaux	1	200
Oporto	1	70
Baltic	1	100
Norway	1	200
Petersburg	1	90
	—	—
	35	8,130

Home

OF THE COUNTY OF ANTRIM. 521

<i>Home Trade.</i>	<i>Ships.</i>	<i>Tonnage.</i>
London	3	550
Liverpool	5	465
Dublin	3	190
Coasters	9	705
	—	—
	20	1,910
	—	—
* Total vessels	55	Tonnage, 10,040

The following history of the ship-building business of Belfast not only gives the state of that branch for the last twenty years, but also of the different trades, in which the town is at present engaged both for itself, and as employed in the carrying for others. I shall give it in Mr. Wm. Ritchie's† words, by whom I was favoured with it. After mentioning a previous visit to Belfast in March 1791 and his giving up the ship-building in Scotland, for the purpose of commencing it here, he continues; "I returned to Belfast on the 3d of July following, with ten men and a quantity of ship-building apparatus and materials; my brother having served his apprenticeship with me, I gave him a third share of the business,

3 x in

* Furnished by Mr. H. Joy.

† Mr. Ritchie came from Saltcoats.

in which we continued until the year 1793 when we dissolved partnership; afterwards he commenced ship-builder on his own account; he died in January 1807; but the business of his house has been continued by my brother John under the firm of John Ritchie and sons. Since the commencement I have built 32 vessels, and my brother eight, besides several lighters and small ones. The vessels I have built were from 50 to 450 tons burthen, the greatest part about 220 tons. When I came to Belfast, there was only about six jobbing ship-carpenters; being without any person to direct them, they were not (by that means) constantly employed, as the vessels belonging to the town were purchased and repaired in England and Scotland; since I came here, I have brought from Scotland several ship-joiners, block-makers, and blacksmiths. In my blacksmith's shop all kinds of ship-work are done in the best manner, also anchors of all sizes to 14 cwt. There are now employed in the two ship-yards, 44 journeymen carpenters; 55 apprentices, 7 pair of sawyers; 12 blacksmiths, and several joiners; the weekly wages about £120. The increase of this business is partly owing to the accommodation of a good graving dock, capable of containing at one time three vessels of
200 tons

200 tons each. These ship-yards and graving dock stand on ground, that I reclaimed from the sea by embankments and quays fronted with stone.

“ In 1796 I engaged with the Ballast office corporation to build the dock mentioned, which I completed 1st of January 1800: When I came to Belfast 1791, the Liverpool traders consisted of four sloops, each about 80 tons burthen, and the London traders of four brigs of 160 tons. There are now in the London trade ten brigs averaging 270 tons, and in the Liverpool trade 8 brigs of 160 tons each; there are also two brigs, that trade to Bristol, of 150 tons, one brig, and two sloops in the Dublin trade averaging 90 tons. The above 26 vessels trade constantly to their respective ports; the 10 London traders are armed and fitted out in the completest manner. All the other vessels are kept in the best state of repair and equipment. In addition to the above, there are 12 ships and brigs trading to the West Indies, and other parts, that will average 350 tons each, all armed and fitted out in the best manner; also a number of other vessels of various sizes, that trade to different places. The greatest part of the traders and West India vessels have been built in Belfast, several of them with Irish oak ;

oak; and it is but justice to say, that for elegance of mould, fastness of sailing, and utility in every respect, they are unrivalled in any of the ports they trade to."

" Belfast July 31st, 1811.

" WM. RITCHIE."

*The annexed list will show the number of vessels registered out of Belfast, their tonnage, and men they are navigated by, for the last seven years.**

Year,	Month,	Vessels,	Tons,	Men,
1804	Sept. 30	67	6,031	447
1805	do.	62	5,544	409
1806	do.	68	5,894	421
1807	do.	67	6,301	448
1808	do.	71	6,750	507
1809	do.	79	8,084	655
1810	do.	79	7,925	682

Government

* One observation occurs in comparing the tonnage of this list for the last years with that of 1785; the vessels are now in number more by 24 than at that time, the tonnage less by 2,000 tons. It may probably arise from the difference between real and computed tons. This, however, is only conjecture.

Government of the town.

The corporation having already been mentioned, it is only necessary to say, that the sovereign has the government of the markets, the regulation of the cranes and weights, and all things respecting the sale of provisions &c. brought into the town, of which he is the chief magistrate, and for the time being also a magistrate of the county of Antrim ex-officio. By patent he is clerk of the market, which gives him the power, by himself or by deputy, of settling all matters relative to it; certain established duties and customs being payable to him, out of the sale of different articles exposed in the market, from the revenue of which he is paid, and the other expences of the situation defrayed.

Police.

Commisioners and a committee of Police are appointed, by virtue of an act of Parliament obtained by the town in 1800. They are vested with authority to carry into execution all regulations therein specified, under certain penalties, respecting

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ing the paving, lighting, and cleaning the streets, as well as many other circumstances affecting the health, safety, and comfort of the inhabitants.

The Commissioners are twelve, chosen for life, besides the burgesses who are so by act of parliament; the committee are chosen annually in February, and sit every Saturday. Whatever complaints may be made respecting the expenses incurred, and the mode of levying the Police taxes, the improvement of the town since its establishment is most manifest. The amount of the taxes for 1810 was £3,087 18s. 0d. for 1811 it is £2,559 6s. 8d.

The Ballast Corporation,

Was embodied in 1795, by act of Parliament giving power to the corporation to make bye laws, for cleaning and improving the harbour, regulating the conduct of masters and owners of shipping &c. resorting to this port; respecting the throwing in and taking out of ballast, stationing and mooring vessels, imposing fines for transgression of their laws, employing and licencing pilots, building wharfs, making wet and dry docks, &c. The profits arising from this corporation,
after

after defraying the expence of improvements, and other matters, is by the act at the disposal of the president and committee of the Belfast charitable society, for the support of the Poor house and Infirmary.

The improvement of the quays, and harbour, under this body has been very considerable; many new quays have been made, and the channel of the harbour by judicious management has been deepened one half.

Chamber of commerce.

A Chamber of commerce was established in 1800; its duty is understood to be, to guard the mercantile interest against encroachments, as also to arbitrate any dispute between merchants. By the charter of Belfast, it appears the corporation had the power of appointing a guild of merchants with a seal; but no *powers* are mentioned as belonging to the body.

Belfast Insurance Company,

For the insurance of ships, merchandize, and lives, also against fire, and for the purchasing
and

and granting annuities. Capital one hundred thousand pounds.

Banks.

There are three banks, the Belfast bank, Donegall-square north; Belfast commercial bank, Donegall-street; and the Northern bank, No. 5, Donegall-place.

White Linen-hall,

Situated to front Donegall-place, was built by subscription of the inhabitants in 1784. Sale of white linens commenced in 1785; there has been a regular and constant market since that time; and a considerable quantity has been sold and exported to England, Scotland, to the West Indies, and to America. This hall very much facilitates the making up of assorted cargoes for foreign markets; it cost £10,000, and was granted by Lord Donegall in perpetuity.

Brown

Brown Linen-hall,

In Donegall-street, where a considerable quantity of fine yard-wide linen is sold on each market day, (Friday). This building has been lately repaired and improved, by a subscription of the linen merchants of Belfast and its neighbourhood.

Public Weigh-house,

In a new street at the end of Waring-street, near the dock. The market for butter and pork for exportation is held in this place. It commences at 8 o'clock each morning during the season. Here is also a crane at Smithfield for hides, and a market for grain in the same.

A public Bakery, Church-Street,

Was set on foot in 1800 at a period, when extreme dearth prevailed, and when the poor

would have felt its effects still more keenly, had it not been for this useful institution. From October 25th 1809, until the same date 1810, 254 tons, 10 cwt. of flour were baked there, producing 185,935 loaves at 1s. 1d. each.

Education.

In the present state of education, the first is the Belfast Academy in Donegall-street, under the direction of a president and trustees. It consists of several schools, for the different branches of classical and mercantile education ; of this academy, superintended with so much credit to himself, and of advantage to his pupils, the Rev. Doctor Bruce is principal. An academy is also kept in Church-lane by the Rev. Robert Acheson, in which the several branches of education are taught by different masters. There is a third classical and mercantile school in Corn-market by Mr. Samuel Lyons. In addition to these, are a number of schools for different purposes of educating those, whose situations in life do not require the ornamental parts. At Mount Collyer near the town, in a most healthful situation, is an academy of great character,
the

the chief master of which is the Rev. Dr. Drummond, author of the poem of Trafalgar.

The public schools upon charitable foundations, are the public day-school, and the weekly, or Sunday school. The first was established in 1801 by a number of respectable ladies of this town, and is supported by voluntary subscriptions; it has lately been renovated by the energetic and laudable exertions of those, who founded it, and who continue their protection. In this school, it is said, religious instruction is particularly attended to; for those, who devote their time and money to promote the education of persons, who would otherwise remain uneducated, must of consequence be conscious of the advantage of adding to other instruction religious instruction, knowing that, the more ties there are on the human passions, the better it is, and that to those, who are early imbued with sentiments of religion, there is always a hope of return to virtue, if they go astray, whilst the state of those, who have them not, is, in the same circumstance, truly hopeless.

Weekly or Sunday school,

Held off Waring-street, supported by voluntary subscription, opened 31st January, 1802, for the free education of such young persons as require it; for servants and apprentices in particular, who could not attend any other school. It receives the gratuitous attendance of thirty-four teachers; eighteen members compose its committee. Upwards of 150 scholars were admitted in 1810; present attendant scholars 250; admitted since the commencement, 1054. It is with pleasure the committee and teachers announce the realization of their long contemplated object, that of an enlarged and suitable building for this best of purposes. The building (both spacious and handsome) is now in so forward a state, that they hope to occupy such a portion of it as will contain 500 children on the 3d of February next; their great object is also to extend it to a day school. It is understood, this school is to be on the Lancastrian plan.

School

School for the Blind.

There is a school of this nature, upon the same plan as that at Liverpool, where those, who are deprived of the blessing of sight, are taught such branches of industry as they are capable of learning; and, as the account of the institution well expresses it, "instead of being a burthen upon society, they contribute their share in its maintenance." The making of baskets is the work they have been chiefly engaged in, and which they have carried to considerable perfection.

Belfast branch of the Bible society,

Is most respectable and extensive. It is well known, that the objects of this society are to propagate the principles of Christianity, and to diffuse a general knowledge of the Scriptures on an extensive plan, embracing all denominations, without respect to religious distinctions.

Academical

Academical Institution.

In 1808, a subscription was opened for the purpose of establishing this institution on the most extensive and liberal plan. Large schools are to be built and endowed, for educating youth for every profession; and professorships are to be founded in the following branches:

Mathematics,	Logic, Metaphysics,
Natural philosophy,	Moral philosophy,
Belles lettres,	Botany, and
Chemistry,	Agriculture.

The direction is invested in a president, four vice presidents, twenty managers, eight visitors, and three auditors. They are elected in the manner following: the president retains his office for life; one-fourth of the other officers vacate their places annually, and their seats are supplied by ballot at a general meeting of proprietors. A subscription of five guineas qualifies for a proprietor, and also for the office of a manager; fifty guineas for that of vice president; that of president is vested in the Marquis of Donegall.

The

The fund for carrying this undertaking into execution amounts to £16,000, solely collected by subscription, and is still increasing. Application is to be made to Parliament for a charter of incorporation, and a pecuniary grant in aid of its funds. So laudable an undertaking certainly deserves national attention and encouragement, without which, after the necessary expenditure in building (which is now rapidly going on), funds sufficient for the endowment of professorships would not remain. The foundation-stone was laid on the 3d of July, 1810. The edifice fronts Donegall-square north, and will have a fine effect when viewed from thence.

Literary Societies.

The Society for promoting knowledge is held in the central room of the White Linen-hall, and is regulated by a president, vice-president, and committee; it possesses 2000 volumes, many of them very valuable; also philosophical instruments. Registers of the thermometer and barometer are kept there. There is also a cabinet of minerals.

The Literary society meets once a month, and has for its object polite literature, sciences, antiquities,

tiquities, and the history and present state of the county of Antrim. Papers are read upon some one of these subjects by each member in rotation. Fasciculi are occasionally published.

The Society for acquiring knowledge commenced about 1806; it has already an extensive library of well chosen books, and excellent globes. Admission £1. Monthly subscription 1s. 1d.

The Philosophical society, on the basis of the Galvanic society; the members of which, although they continue engaged in the investigation of the laws and phenomena of that curious science, wishing to extend their views into a wider and more general research, have now procured a valuable apparatus, which enables them to perform many curious and interesting experiments.

Medical Library,

Was formed in 1806, by a number of the most respectable physicians, surgeons, and apothecaries. Admission is not confined to Belfast or its vicinity; accordingly, many practitioners from different parts of the country are become members of it. This establishment must contribute to the improvement of medical science, as it affords an opportunity of consulting

consulting books too expensive for many individuals to purchase. Since its establishment, some rare, and a great variety of other books, which have been published within the last twenty years, relating to medicine, surgery, pharmacy, and chemistry, have been purchased, with which the members of this most useful institution have been accommodated.

Irish Music School.

The exertions of Belfast, to restore the ancient music of the country, shew its taste and public spirit; and a school has been instituted for the purpose of teaching, to play upon the Irish harp, a number of poor scholars, Mr. George Bunting generously proposing to superintend it; and Mr. Arthur O'Neil, the most respectable and capable player on this instrument, now remaining alive in Ireland, has engaged as teacher thereof. More than 250 guineas have been subscribed for this purpose; the scholars to be chosen from such candidates as have the best moral characters, and evince the greatest genius for music. There are at present twelve regular, besides a number of private pupils, male and female.

Public vehicles of intelligence.

Two news-papers are published in this town, and so arranged, that five days out of the seven are supplied; the News-Letter being published twice, and the Chronicle three times a week; they are both conducted with ability and decorum. Of the Belfast News-Letter, first edited in 1737, and probably the first printed north of Dublin, it is not too much to say, that for more than half a century, in a most extensive circulation, it filled the respectable station of an accurate intelligencer, and of a faithful monitor to the people of the north of Ireland; from which task, rendered truly arduous at a most critical period, it never shrunk.

About three years ago, the first number of a Monthly Magazine was published, which has since been carried on: amongst a variety of subjects, several papers, descriptive of places and circumstances, relating to the county, have found their way to it; most of them have been instructive and entertaining. It also contains agricultural, commercial, medical, meteorological, and naturalists' reports, with the celestial phenomena for the month following its publication. The work is a highly creditable specimen of the Belfast press.

An

An almanac is annually published, which in a small compass, and at a reasonable price, contains much useful information.

Charitable Institutions.

Belfast Incorporated Charitable Society.

A large commodious house,* healthfully situated at the north end of Donegall-street, and well supplied with spring-water, was built by subscriptions and lotteries; ground granted by the Earl of Donegall; foundation laid in 1771; cost about £7000; incorporated by act of parliament, 1774. It is directed by a committee, annually elected by subscribers to the institution. The present year it affords asylum to 57 aged men, 89 aged women, 108 boys, 85 girls, who are clothed, fed, and the two latter educated, and at a proper age apprenticed to suitable employments. Applications for admission are presented in the form of petition, stating the residence of the person, &c. and signed by one or more subscribers, who vouch

* It was in this house the first rudiments of the cotton trade were taught; history of the cotton trade.

vouch for the truth of the facts. These petitions are examined on Saturday, and referred to a sub-committee. Expenditure from November, 1809, till November, 1810, £ 2671 : 18 : 9½.

Dispensary and Fever Hospital,

No. 32, West-street.

These united institutions are supported by the voluntary subscriptions of the inhabitants of the town and neighbourhood. The dispensary was instituted in 1792. The fever hospital in 1797. The house is at present capable of containing 25 patients. The out patients are supported at their own abode; their number is unlimited. The children of the poor are inoculated with the cow-pock. Instruments for the recovery of drowned or suffocated persons are provided. Any person may be admitted on the recommendation of a subscriber, or, without such recommendation, by paying one guinea to the fund; or if the complaint be very urgent and distressing, and the patient extremely poor, he will be admitted, by paying a crown per week to the fund. These regulations have enabled many people, not natives of the parish, to derive
signal

signal advantages from this charity, without consuming any part of the subscriptions, which are entirely appropriated to the relief of the inhabitants. It was originally limited to the admission of fever patients only; but since that disease has been so far extinguished by means of this institution, as that very few cases of it have lately appeared, the managers were induced to admit those labouring under many other complaints, and a great number of surgical operations have been successfully performed there. The annual subscription is upwards of £323. Occasional supplies have been procured by sermons, concerts, &c. sometimes to the amount of £300 annually. The number of dispensary patients admitted in the course of last year was 219; of hospital patients 197. No person labouring under any infectious fever is ever rejected. The statement of these facts, it is hoped, will not only secure its permanency, but induce other towns to adopt similar plans of safety, which a late act of parliament will render very easy. By an application to the grand jury, at the assizes in 1807, the sum of £193 : 7 : 6 was presented on the county at large for the support of this charity; the public money granted according to the same most excellent act, for the year 1810, was £320 : 19 : 10, and the committee has resolved to admit
patients

patients from all parts of the county, in proportion as these public grants enable them to do so without any detriment to their own town or parish; and it is hoped this mark of public favour will extend the utility of the institution far beyond its former limits, and tend ultimately to establish a general hospital in Belfast, a thing which cannot be considered but of the utmost moment. The unbounded and generous spirit, which has been displayed in the subscriptions to other useful institutions, leave us no doubt, that a similar zeal will be manifested in building and supporting an hospital, whenever the inhabitants are called upon for such an exertion of enlightened benevolence. In order to effect this laudable purpose, the society has begun to appropriate such sums, as have been received in the form of donations and bequests, to raise a fund for building; and the Marquis of Donegall, with a liberality which has always distinguished that family, has allotted a portion of ground, in an eligible situation, for the purpose. Some persons have already subscribed, unsolicited, for beginning this pious work; and it is hoped, this notification of the object will contribute to promote the subscription. To a reflecting and compassionate mind no kind of charity can appear so urgent, so important, or so vitally requisite

as this ; and it would appear a very singular thing (if one did not see it often) that any kind of public edifice, whether for religious worship, for education, for the common poor, or for the purposes of commerce, should have ever been established, either by individuals or states, until hospitals for the sick poor were first erected. Medical attendance is given by the physicians and surgeons gratis. Salary of the resident apothecary, £ 50 ; of the nurse £ 16.

Lying-in-hospital,

No. 35, Donegall-street,

Commenced in January, 1794, and has been uniformly carried on with the utmost care and economy, under the inspection of Lady Harriet Skeffington, vice-patroness, and other ladies in office, who meet once a-week to transact the business.

From January 1, 1810, till November 12, 45 were relieved, consisting of poor labourers', tradesmen's, and soldiers' wives, (whose infants were clothed.) The philanthropist must contemplate with pleasure the benevolent hearts of those ladies
in

in the higher walks of life, who thus devote much of their time and property to meliorating the situation of the distressed. This charitable institution is supported by subscription, and is chiefly indebted to its noble patroness, the Marchioness Dowager of Donegall, as her ladyship gave £ 50, till the death of the late Marquis, and has ever since generously contributed the sum of £ 20 annually.

House of Industry.

This institution was formed in Belfast about the beginning of the year 1809, for the purpose of abolishing mendicity, and assisting the industrious poor.

A committee was formed for carrying this into effect, and the town divided into districts, and visitors appointed to inspect the different persons in each, who might be considered fit objects for the charity. A large subscription was immediately made by the inhabitants, a convenient building purchased, and work provided. The beggars were then ordered off the streets, and those, who could work, were furnished with materials, either in their own houses or in the house of the institution, called
the

the house of industry; and what their work was found deficient in providing for their support, was made up by a portion of soup, which is daily supplied to them from the house, and in coals issued weekly, according to the necessity of each; those totally helpless are put into the poor-house, by permission of the committee of the charitable society, or in some few instances otherwise provided for.

The institution has now been operative nearly two years, and seems fully to answer the end proposed by its founders. The town is freed from a most disgraceful and distressing sight, a multitude of human beings brought up in the habit of idleness and vice, daily filling the streets, and extorting, by their importunity, far more than is now sufficient to make them live at home in comfort; and as they are compelled to do something to earn a livelihood, there are hopes that they may in time, especially the young generation, become industrious and useful members of this community.

Belfast Repository.

This institution was founded by some patriotic ladies of this town, who liberally advanced the

sum of money necessary for its establishment ; the object of which was to open a warehouse for the sale of such articles as were produced by the labour and industry of all ranks of society, both in the town and neighbourhood. We have great pleasure in announcing to the public, that the institution has succeeded beyond the expectation of its warmest advocates, affording a speedy sale of such goods as are not in the repository, of which the owners had no other mode of disposal; and it has been the means of relieving a great many families, as well as deserving individuals, from distressed and narrow circumstances. The institution has excited a spirit of emulation, which has produced many works of great taste and merit.

The articles sent in are examined by the committee, every Saturday, and the lowest price affixed to each. The interest of the original funds has enabled each of those benevolent and highly exalted ladies, who established and conducted this useful institution, to present a comfortable suit of cloathing to an indigent and worthy female. The institution receives support by occasional balls, &c.*

This account of the numerous foundations, whether connected with the commerce, literature, or
charitable

* To the Belfast Almanac for 1811, I am indebted for this detached account of these different establishments.

charitable establishments of Belfast, so highly creditable to it, requires no comment, nor does the insertion of them at length require any excuse; it would be unfair to withhold from them any of that attention, which is their due, or, from others, an example so highly deserving of imitation.

Places of Public Worship, &c.

An established church, built by the late Marquis of Donegall; it is a most light and pleasing edifice, but not sufficiently large for the congregation, for whose further accommodation a chapel of ease is in contemplation; six meeting-houses for Protestant dissenters; two Catholic chapels; a Quaker meeting-house, and a Methodist chapel.

Other public buildings, not mentioned before, are the Exchange, near the centre of the town; over this are an elegant set of Assembly rooms, and, on the ground floor, a coffee or news-room; on a rising ground, to the north of the poor-house, the New barrack, and the Artillery barrack near the Carrickfergus road; and on the Malone side of the town the Old barrack.

Considerable

Considerable attention has been paid by the Committee to give an additional supply of water to the town ; accordingly, a new reservoir has been formed, near the Malone road, of the best spring-water, to be conveyed into the town by pipes ; these pipes are of cast metal, and, though more expensive at first, in the end, from their superior duration, they will be cheaper than timber.

The meat market is a neat square of shops ; the vegetable market adjoining it. The former is well supplied at all seasons ; and, although the price is in general much higher than it formerly was, the difference in price at the different seasons is less than it was, from the regular supply afforded by stall-fed cattle in the winter and in spring. Besides the cattle furnished by the neighbouring country, numbers are brought from distant countries, both for exportation, and for home consumption. Many sheep are also bought in the counties of Louth and Meath ; but the pork and veal, which are good, the neighbourhood supplies. Lamb is seldom early, and, until the spring is advanced, always scarce, as breeding for market has not yet become an object, though, if properly attended to, it would certainly be profitable. Poultry of all kinds are collected from considerable distances, and brought to market here ; and, since the buying

ing them in for this purpose has been a regular business, though more are bred, the price has been doubled in the remoter parts, where they are reared. The fish-market is very good, and now receives an additional supply of turbot from the distant coasts of Derry and Antrim by the coaches.

Of vegetables there is great plenty, and, in favourable seasons, of fruit; with the more delicate kinds some shops are supplied from the superfluities of the best gardens in the vicinity.

The advantages of Belfast market are not confined to the opulent; from the nature of its trade, it affords to the lower classes considerable resources for great part of the year; first, in the least valuable parts of the cattle killed for exportation, which are sold at reduced prices; and in those parts of the pork, which are separated from the rest before they are barrelled; for these there is always a ready sale, as they are disposed of in such quantities as suit the circumstances of the buyers. Also, of potatoes and oatmeal there is a regular market.

Belfast Markets, September 17, 1811.

	s.	d.	s.	d.	
Oatmeal	18	3	to	18	6
New ditto	19	0	—	19	6
New wheat	15	0	—	16	0
New barley	11	0	—	11	6
Old oats	11	4½	—	0	0
New ditto	10	0	—	10	6
First flour	32	0	—	34	0
Second ditto	30	0	—	32	0
Third ditto	28	0	—	30	0
Fourth ditto	20	0	—	22	0
Fifth ditto	16	0	—	0	0
Bran	7	6	—	9	3
Firkin butter	122	0	—	0	0
Russian tallow	72	0	—	0	0
Buenos Ayres ditto ..	72	0	—	0	0
Brazil ditto	70	0	—	0	0
Rough tallow	8	0	—	0	0
Rough lard	0	0	—	0	0
Beef	47	6	—	50	0
Pork	30	0	—	40	0
Salt skins	50	0	—	54	0
Cow hides	30	0	—	40	0
Horse ditto	5	3	—	8	4
Calf skins (skins) ..	0	4	—	0	5
Veal ditto	0	7	—	0	8
Potatoes	0	6½	—	0	7
Fresh butter	1	3	—	1	4
Scale ditto	1	0½	—	0	0
Beef	0	5	—	0	6½
Mutton	0	6½	—	0	7½
Veal	0	6	—	0	6½
Liverpool coals	0	0	—	0	0
Cumberland ditto ..	26	0	—	0	0
Scotch ditto	24	0	—	0	0
Scotch malting ditto	36	0	—	0	0

} per cwt. of 112 lb.
Bank notes.

} per cwt. of 112 lb.
Bank notes.

—per stone of 16 lb.

} per cwt. of 134 lb.

—per hide.

} per lb.

—per stone.

—per lb. of 18 oz.

} per lb. of 16 oz.

—per ton.

Lisburn Markets, September 17, 1811.

	s.	d.	s.	d.	
Oatmeal	19	6	to	20	2
Oats	8	6	—	11	0
Potatoes	0	4½	—	0	5
Beef	0	4	—	0	5½
Mutton	0	6	—	0	7
Veal	0	0	—	0	0
Fresh butter ...	1	1	—	1	2

per cwt. of 130 lb.

per cwt. of 112 lb.

per stone.

per lb. of 16 oz.

per lb. of 20 oz.

Comparative

OF THE COUNTY OF ANTRIM. 351

Comparative prices of different articles, at the beginning of the eighteenth and nineteenth centuries.

18th Century.

19th Century.

£. s. d.

Paid for six hogs 2 6 3 Now the price of one small hog not fat.

4 barrels of wheat 2 0 0 Now about the price of one barrel, or 2½ cwt.

Feb. 27.

30 bullocks 67 0 0

Not 2 guineas a piece. From the time they were bought in, they must have been poor.

A fat hog 1 5 0 Supposing the hog 2 cwt. the the price would now be from four to five pounds.

3 bushels of barley 4 6 About 3s. per hundred; now near four times as much, or 12s.

March 20.

5 Boles oats 2 10 0 The price, Mar. 1811, about a-bole being 10 four times as much, or 2l. bushels.

Kitchen.

18th Century.

19th Century.

£. s. d.

Kitchen-maids'

wages per ann. 2 0 0 } Here is a great change.

Housekeepers' do. 5 0 0 }

12 ton coals 4 16 0 Now about 1*l.* 4*s.* per ton.
about 8*s.* per ton.One cwt. butter 17 0 Now about 6*l.*

Two pair buckskin

breeches..... 2 0 0

One pair boots ... 12 0

Nov.

30 fat bullocks 90 0 0

3*l.* a piece.

81 fat wethers 21 18 9

little more than

5*s.* each.

Nov.

12 geese 0 4 0 The price of these would
now be from 2*s.* to 2*s.* 6*d.*
each, without the feathers.

2 hhds. claret ... 26 0 0

Mason, six days

work 6 0 Now from 15*s.* to 18*s.* per
week.

Gardeners' wages

for one year... 7 0 0

Paid for 26 neat's

tongues 13 0 Now from 2*s.* to 3*s.* 6*d.* each.

As

Mail Coaches, &c.

As all those circumstances deserve particular notice, which denote any remarkable change, the introduction of numerous public vehicles must be mentioned. Previous to the mail-coach establishment, there was not any regular carriage for the conveyance of passengers from Belfast to Dublin; it is said many attempts were made for such a purpose, which all failed; nor was there any thing of the kind between Belfast and any of the other northern towns; nor, until within the last three years, was there any trial made, how such an arrangement might answer. Now, there is not only the mail-coach, which leaves Belfast for Dublin every morning at ten, but there is another, which sets out three days in the week for the same place; as also the Lurgan and Armagh coaches five days in the week, and the Lurgan diligence three days; all in a southern direction. A coach leaves Belfast every evening for Donaghadee, with the mail.

To the north-west, are the Belfast and Derry Royal mail, which leaves Belfast every evening at half past four o'clock, and arrives at Derry the next morning at ten; and the Coleraine day-coach,

which starts from Belfast every Monday, Wednesday, and Friday, at eight o'clock, and arrives at its destination the same evening. The Larne coach leaves that place on the mornings of Monday, Wednesday, and Friday, at six o'clock; arrives at Belfast at half past nine; returns from Belfast the same evening at four, and arrives at Larne at nine. The Downpatrick coach leaves that place on the same days as the above, and likewise returns the same evenings. A coach also leaves Lisburn every day in the week, except Sunday and Tuesday for Belfast, and returns in the evening. Much of this accommodation is owing to the enterprising spirit of the late Mr. John M'Coy, who first tried the experiment, whether any public carriage could exist without the advantage of conveying the mail, and in opposition to it; he plainly shewed it could be done;—but, being killed by a fall from his own coach, he left others to reap the advantage of his attempt;—and no man in his station was ever more, and deservedly, lamented.

Miscellaneous Observations.

After this, which may be thought a too ample detail of the several objects afforded by the town
of

of Belfast,* a few observations, notwithstanding, must be admitted respecting its general appearance, &c.; this is remarkably cheerful, the streets being mostly spacious, straight, carefully paved, and clean, and at night well lighted, and the houses almost all well built, and of brick; though some of the lanes and entries are narrow, they are not numerous, and attention is paid to their cleanliness.

Formerly the river, which runs into the dock in High-street, was uncovered to the bank buildings, except where the necessary communications required bridges; the covering of this was the first great improvement.

The bridge (mentioned in another place,) the foundation of which was laid in 1682, being only 21 feet wide, is too narrow for the present day, as it is the only direct communication with the county of Down, from whence there is an incessant resort. But another bridge to the south of this, and in part executed, will considerably lessen the thoroughfare on the former. This bridge will, with the new streets laid out from it, form a line with Donegall-square, south, and will afford an easy and shortened

* The manufactures of Belfast having been spoken of under the general head appropriated to this subject, it is not necessary to repeat them here.

shortened entrance from a very populous part of the county of Down, on the Saintfield side, and lead to the new market place, and newly laid out streets in that quarter. Another new approach is intended on the Carrickfergus side, by which the hill in Donegall-street will be avoided, and a better opening made to the northern parts of the town. Near the town several embankments have been made on both sides of the river; those of Ballymacarret were first done; on the Carrickfergus road, a considerable scope has been brought in by Mr. Thomson, of Jennymount; and further on by Mr. Sinclair, which is now in other hands, but seems likely to succeed. Another piece near the new bridge has been very completely done by Mr. May. To raise these grounds taken from the sea, it is probable that letting in the tide, and allowing the water, by stagnating a certain time, to deposit the mud it brings along with it, might answer a good purpose. This operation, called in England washing, is much practised at the mouths of rivers, which carry a considerable quantity of the finer particles of earth suspended in their waters, whilst they are in motion, but which are soon deposited by them when at rest. Whether this deposit is in a sufficient portion in these waters, remains

mains to be tried. In some parts of England, by this mode the ground has been raised, but particularly on the banks of the Humber, from 18 inches to 2½ feet, and this in one season, from June to September.

In the neighbourhood of Belfast, where ground is so valuable, it would at least be worth a trial.

The Marquis of Donegall is proprietor of the ground, on which Belfast stands, probably the largest and most flourishing place in the possession of any individual in the united kingdoms; and by his lordship every liberal encouragement is afforded to all public and private undertakings, which can benefit his town.

Strata found on boring in a garden in Belfast, 1786.

	Feet	Inches
Soil and sand - - -	8	0
Blue clay with sea shells -	28	6
Sand mixed with shells, particularly oyster-shells - - -	2	6
Moss - - -	0	4
Gravel intermixed with hazel-nut- shells - - -	0	8
	<hr/>	
	40	0

				Feet	Inches
				40	0
Red clay	-	-	-	29	0
Sand	-	-	-	1	4
Red clay	-	-	-	35	2
Sand	-	-	-	0	7
				<hr/>	
				106	1

It appears from this statement, that the nut-shells were found 40 feet under the present level; that they again were covered with moss, (turf bog,) and that again washed by the sea, as appears by the sand and marine shells, found at the depth of 36 feet below our present surface. This arrangement is a curious proof of the sinking of the surface in our area.

SECT. 12. *Agricultural Societies—Measures, &c.*

An agricultural society for Lower Massarene and Glenavy was set on foot about the year 1803; their objects were judicious; they tended principally to the encouragement of those improvements, which were within the reach of every farmer of 20 acres of ground, or even of a lesser quantity.

Their

Their first proposal was to encourage the saving of flax and clover seeds; ploughing, ditching, and attention in breeding cattle were also recommended, and strong reasons were adduced to shew the advantages of cultivating green crops for winter food, with proper directions for raising them; and the society seemed to be resolved to extend their attention to many different objects, and to encourage them by premiums. But unfortunately this society no longer exists; from what cause is unknown; but that it is so, is much to be lamented, as their commencement was so good.

Another society of the same kind was established, nearly at the same period, in Carrickfergus; it has also shared the same fate as that of Glenavy; why it has, remains to be explained. Such meetings as these, if no premiums were offered, may do good, by the discussions they produce; for men are often induced by this means to turn their minds to objects, that otherwise they should never have thought of. A society of real farmers, on the borders of the counties of Down and Antrim, has had a meeting for the purpose of establishing something of the kind. From men, whose knowledge is founded on experience, much good may be expected, provided they persevere, and that these meet-
ings

ings may not be converted, rather to the purposes of conviviality than of business.

Measures of Land.

The measures of land in this part of Ireland being so various, I give here the difference of perches, on which they depend. English statute measure is five yards and an half, or sixteen feet, six inches, to the pole or perch. The Irish plantation perch is seven yards or twenty-one feet; therefore eleven perches, Irish measure, are equal to fourteen perches, English measure; and eleven miles, Irish, to fourteen English; the Irish mile being 2240 yards, and the English 1760. But, the different acres being to each other as the squares of the different perches, the excess of one above the other is in that proportion; five Irish acres being equal to eight English, fifteen perches and a small fraction; and those, which follow, are in the same proportion.

Irish church-land measure is the same as plantation. Burleigh measure is six yards or eighteen feet to the perch; therefore eleven perches in length are equal to twelve English. Woodland measure is the same as Burleigh measure. Forest measure is eight yards or twenty-four feet; there-
fore

fore eleven perches in length are equal to sixteen English. One perch Cunningham measure is six yards and an half, or eighteen feet nine inches; therefore twenty-five Irish perches are equal to twenty-eight Cunningham. Scotch measure is only six yards and one-sixth, or eighteen feet six inches; thirty-three Scotch perches are equal to thirty-seven English.

Dry and Liquid Measures.

A barrel of corn or coals contains four bushels of 32 quarts $7\frac{1}{2}$ parts, or eight gallons; barrel of lime or of salt three bushels; Irish gallon for liquids contains $273\frac{1}{8}$ cubic inches; English wine gallon 231 cubic inches; do. beer gallon 280 cubic inches; one bole contains 10 bushels; 1 bushel four pecks, and 1 peck eight quarts.

Weights.

Formerly the different sorts of grain were sold by measure; now they are all sold by weight, which is by much the more accurate way of ascertaining not only the quantity, but the quality. Oats, wheat,

4 C

and

and barley are sold by the cwt. of 8 stone, each containing 14 pounds, or 112 pounds; twenty of these make a ton; but oatmeal is often sold by the cwt. of 120 pounds; beef and pork are also sold by the same; butter is sold, salted, by the pound of 16 ounces; when fresh, the number is arbitrary from 16 to 20 ounces; the stone of flax, wool, and tallow, each contains 16 pounds. With the origin of these differences it is not easy to get acquainted; but that they are productive of inconveniencies, is most evident, as well as that all should be reduced to one standard.

SECT. 13. *Mills—Fisheries, &c. &c.*

Mills are established in this county upon the same footing as they are in other parts of Ireland; the tenants are bound to pay a certain portion of the grain, which is manufactured, for the trouble and expence of the operation; in some places they are bound to pay the sixteenth, in others less; but in most mills the full proportion is seldom taken, as that induces the tenants to frequent them, rather than risk a fine by going to other mills, where their business would be cheaper done. Great improvements have been made in the construction of mills and kilns; both in the expedition, with which the
work

work is performed, and in the improved manner of drying, cleaning, and grinding; all of these processes being often performed under the same roof. Tiled kilns, and kilns covered with metal plates are substituted generally for those formerly employed, where the grain was dried on straw supported by wooden ribs. Extensive mills for the manufacture of flour have been erected at different places; the first was Crumlin mill; since that, one has been built at Antrim, another at Muskamore; near Lisburn, is the flour mill of Messrs. Fulton; one at Dunmurry, by Mr. Hunter; near Belfast, this business is extensively carried on by Mr. Alexander; and a very great work of this kind was lately built at Larne. The late Mr. Lesly of Lesly-hill, during his time, encouraged the growth of wheat in that neighbourhood by his flour mill; since his death it has not been employed, and little wheat is raised thereabouts for want of a market, though the soil there and near Ballymoney is well adapted to that grain. Objections have been made to flour mills, from the idea of their throwing the great article of wheat into the hands of a few persons of large capitals; but it is not considered by those, who object, that the ready market, the owners of these mills afford for this commodity, is the great encouragement of its growth

growth in all those countries, that are within their reach; besides, it was clearly ascertained during the years of scarcity in England, that more of the nutritive parts of the grain could be extracted by the perfect machinery of these mills than by any other mode hitherto discovered. Upon the whole therefore, though the price of flour may be somewhat enhanced, it is fully compensated for by an increased insurance of supply. Flax mills, for separating the stalk from the fibres of the plant, have been in use in Ulster for near a century; by their means, the labour required for this operation is much abridged; but the manner, in which it is performed, is more severe upon the material, than in the old method of beating the stalk out by means of an upright board and scutching knife. But the expedition and consequent cheapness of the process, by means of the mills, are supposed to make up for any loss by the severity of the machinery.

Fisheries.

The great salmon and eel fisheries have already been treated of. It now remains to say something of those, which our coasts afford in various parts. The taking of the former on the rocky shore at Carrickarade is too curious not to be particularly noticed

noticed. Carrickarade is an insulated rock, which lies off one of the points between Ballintoy and Keenbane head; it is separated from the main land by a chasm, sixty feet wide, and above eighty feet in depth; at the bottom of this the sea breaks with an uninterrupted violence among the rocks. This rock is connected with the main land by an extraordinary flying bridge; as it is inaccessible on every side except one spot, and the turbulence of the sea makes it difficult, unless the weather is very calm, the only resource is to throw a bridge of ropes from the main land to the island, which is accomplished every year by extending two strong cables across the gulph, by an expert climber, which are fastened firmly into iron rings, mortised into the rock on either side; between these cables a number of boards, about a foot in breadth, are laid in succession, supported at intervals by cross cords, and thus the path way is formed, and a single hand rope the only assistant, while the swinging and undulation of the bridge itself impart no very strong ideas of security. The cause of so much pains being taken to obtain access to Carrickarade* proceeds from its being the only place on the coast, where the salmon can be intercepted

* Hamilton's Antrim.—Carrickarade is, in Irish, the rock in the road.

cepted in their passage to the rivers, where they annually go for the purpose of depositing their spawn; for in this expedition the fish generally swim pretty close to the shore, that they may not miss their port; and the fishermen, who are well aware of this coasting voyage of the salmon, are careful to project their nets at such places, as may be most convenient for taking them.

In this kind of fishery the net is projected directly outward from the shore, with a slight bend, forming a bosom in that direction, in which the salmon come; from the remote extremity a rope is brought obliquely to another part of the shore, by which the net may be swept round at pleasure, and drawn to land; a heap of small stones is then prepared for each person. All things being ready, as soon as the watchman perceives the fish advancing to the net, he gives the word; immediately some of the men seize the oblique rope, by which the net is brought round to enclose the salmon, whilst the others keep up an incessant cannonade with their ammunition of stones, to prevent the retreat of the fish till the net is completely pulled round them; after which they all join their forces to drag the net and fish quietly to the rocks. These fisheries have been often very productive, from the vast numbers of salmon, which frequent
our

our coasts and rivers, though it is thought they are rather injured by destroying the mother salmon, which should be allowed free passage through the rivers to deposit their spawn. There is another salmon fishery in the Bush; but all the rivers afford some. The Lagan is now an exception, since the passage of the fish up the river is cut off by the locks and weirs on the canal, though it was once much frequented by them. Eel fisheries might also be established in many rivers, and at little expence. At Carrickmore, near Ballintoy, is an advantageous situation for this purpose. All the rivers abound with them at the season of passing to the sea; but from want of proper attention, and materials for taking those valuable fish, small advantage is made of the plenty, with which they are distributed. Our coasts afford a number of other valuable fish, both round and flat; of the former is the haddock (*gladus æglesinus*), the cod (*morhua*), the whiting (*merlangen*), the hake (*merlucius*), the ling (*molua*), rock cod (*mustela*), the sand eel (*tobinus*), mackerel (*scomber*), grey gurnard (*gurnardus*), red gurnard (*cuculus*), grey mullet (*cephalus*), in Larne lough, sturgeon (*sturio*), not common, herring (*harangus*); there is generally a take of these fish on some parts of the coast every

every summer, but seldom in sufficient quantities as to be a commercial object; the sea bream (*pagrus*,) a fish not esteemed. Of flat fish, the plaice (*platessa*) is the most plentiful of the species; the flounder (*flessus*) is common along the sandy shores. The soal (*solea*) is very fine; the holi-but (*hippoglossa*) taken on the northern coast, though not so frequently as the turbot (*pleuro-nectes maximus*); a constant supply of this so much admired fish is now brought to Belfast by the coasters from the northern parts of the county, and from the county of Derry. Though this speedy mode of conveyance may have raised the price in those parts, it has much diminished it in the Belfast market. The seal (*phoca vitulina*,) and porpoise (*delphinus phocæna*) are frequent, the latter, especially when a shoal of herrings is on the coast; a few stragglers of the cetaceous kind are sometimes seen, and have been wrecked on the coast, as happened some years ago near the Giant's Causeway. The grampus (*orca*) is sometimes seen, and approaching too near the rocks has shared the same fate. Of testaceous fish, the shores afford the lobster and the crab; and oysters of superior size and flavour are produced in Carrickfergus bay.

In

In respect to fish, no country can be better situated than Ireland in general, which must be apparent, if the windings of the different coasts are considered, the numbers of lakes and rivers for breeding or maintaining some of the most valuable kinds, as the salmon and the eel, the conveniency of the bays, and the surrounding waters, abounding in all the different kinds, which can administer to the wants or luxuries of mankind; but certainly these natural and obvious benefits never have been turned to the best advantage; from many causes this proceeds; in some cases, from want of capital, in others from want of skill; as an instance of what may be lost by want of skill, it is mentioned, that the Liverpool market was never well supplied with sole, though they abound on the banks which lie off that place, until fishermen were brought from Torbay, who were better instructed in the business, and taught their method of taking them. In the north of Ireland, the want of attention to this pursuit is less felt than in other parts of the kingdom, where such a progress in agriculture has not been made, and where the increase of industry and manufactures do not afford such constant employment as they do here.

Taxes or Cesses.

The taxes paid by the occupying tenants, are the county cesses, the parish cess, the window and hearth-money taxes, and a kind of land-tax, where the rent is above a certain amount, and where no hearth-money is paid.

By the first of these taxes, it is scarcely necessary to observe, that all new roads and bridges are made, and the old repaired; likewise, out of this fund, the jail is supported, and the county officers paid; or, that this tax is laid on at the assizes, by presentment of the grand-jury, and no money can be received, unless the expenditure is properly accounted for by those, who undertake any public work. The total amount of these taxes, for the year ending at the Lent assizes, 1811, was 31,152*l.* 7*s.* 6*d.* Laid on at summer assizes same year 14,353*l.* 3*s.* 5*d.* In the distribution of these sums, all that is to be laid on the county at large is apportioned on the baronies, according to a certain arrangement formerly made, called the key of the county, first settled from consideration of the different qualities of the lands in the several baronies. After that is
done

done, each barony pays for its roads; therefore, some pay much more than others, as they are differently circumstanced. Of all taxes, this ought to be paid with the greatest cheerfulness; the whole of the money, arising from it, being laid out at home, and the benefits of it being felt by every individual, as well as by those, to whom it gives a regular source of employment, the labouring class, at those periods of the year when there might be a deficiency in other occupations.

Effect of premiums by the Dublin Society.

The most efficient of the premiums offered by the Dublin Society, upon the northern parts of this kingdom, was that for saving of flax seed, especially after the same sum was to be paid per bushel for that saved by rippling, immediately after the hackling of the flax, as for that saved from flax stacked up and preserved till spring. The former met the circumstances of every land-holder; the latter, only of those who had large farms, and could hold over their flax until the following year.

When

When, and by whom, this county was surveyed.

It was surveyed, by order of Sir William Petty, at the time the other parts of the north of Ireland were done.

The divisions are, in general, accurate, though, from the numbers employed, all parts are not equally so. Above thirty years ago it was surveyed by Mr. Lendrick, and a map made of it and published; several amendments have since been made by Mr. Williamson, for the grand-jury, particularly in the insertion of the new roads. Most of them have been copied into the small map, which accompanies this.

Landed Proprietors.

There is a very considerable proportion of landed proprietors resident in the county of Antrim; and, on some of the great estates in the county of Antrim, whose owners are not resident, there are gentlemen who hold under them, that fill the situations of justices of the peace, &c., and pay due attention to all those matters of internal regulation required; attending at assizes and sessions, and taking care of the roads, besides filling up the important situations of officers in the yeomanry corps.

The

The bishop is resident in the diocese of Connor, and almost the whole body of the clergy.

The encouragement given by government, in purchasing land for glebes, in advancing money for building upon them, and in augmenting the income of small benefices, must very much promote this great object.

SECT. 14. *Miscellaneous Observations.*

Scarce birds, which either inhabit about, or occasionally appear in the county of Antrim..

The sea eagle (ossifragus) appears on the coast, but breeds, it is said, in the county of Derry; it is not common. The golden eagle (chrysaetos); these birds prey along the coast and inland; they build in the county of Donegall.

The goss hawk (accipiter palumbarius) builds in the cliff on the coast of Island Magee, called the Gobbins. This bird was esteemed of so much consequence in the days of hawking, from its peculiar excellency in flight, and from its docility, that it was anciently included in the chiefry paid for this peninsula. The mode of taking the young,
for

for training, is by letting a person down from the upper cliffs to the face of the precipice, where the parent birds make their nests, with a close basket to put the young hawks into. As hawking is now so much less in fashion than it formerly was, these nests are not in the present day so regularly robbed as they were.

The Cornish chough (*graculus*) in great numbers along the cliffs about the Giants' Causeway, and on other parts of the coast, where the shores are bold; they do not penetrate far inland. Though this bird has nothing musical in its voice, there is something cheerful in the sound, and in the constant activity they display in their flight.

The sheldrake (*anas tadorna*) only met with on the sandy tracts, where it builds, or rather makes its nest, in holes formed by some other creature, of the down which covers its breast. When taken young, it may easily be tamed, and, from its shape and plumage, is a great addition of beauty to the poultry yard.

The king-fisher (*alcedo hispida*) now very scarce; it is still, however, to be met with in solitary glens, along the sides of rivulets, as its food is small fishes, on which it darts with uncommon velocity, and remains under water in the pursuit for several seconds.

The

The water ouzel (*sturnus cinclus*) about the size of a blackbird, frequents nearly the same places as the former; food the same. This bird possesses the power of walking under water, and its feathers are impervious to moisture. In Collin glen these birds were frequently seen, and in similar situations.

The regular migrations of the barnacle and wigeon (*anas marina*, and *penelops*) are too well known to require very particular mention, except to say, that those, which frequent Belfast and Larne loughs, are accounted very delicate food, whilst in some other parts they are not so. This is supposed to proceed from the quality of the plant, which grows under water, and on which they feed. It is a species of fucus; the Derry survey says, the *fucus saccharinus*.

The pheasant has already been mentioned, as inhabiting the borders of Lough Neagh; at what time this bird was brought to Ireland, it is not easy to say; but it must have been many years ago, as Fynes Morryson, in his account of Ireland, says, "they have such plenty of pheasants, that I have known sixty served at one feast, and abound much more with rails; but partridges are somewhat rare." This observation of his probably proceeded from the difficulty being greater in killing partridges, than either of the other two.

Coltsfoot

Coltsfoot—Tussilago.

In the chapter on agriculture nothing has been said on the subject of weeds, except in a general way; nor is it intended here to go farther, than to advert to the necessity of paying particular attention to those, which propagate both by roots and seed; as the encroachments they make in this double mode of attack rise, when not prevented in time, to a height not easily to be credited. I am induced to make these observations, from the formidable inroads made upon the farmer by that most formidable weed, the coltsfoot (*tussilago*); for some years past it has made a progress truly alarming; and, though by frequent ploughing, and by the drilling of the potatoe crop, and carefully pulling it out when it cannot be reached by tillage, it is in some degree kept under for one season, it shews itself with double vigour in the succeeding crop of grain, and even extends its baleful influence to the ground when in grass; in that situation, unless the grass is mowed, it too often is allowed to ripen its seeds, which, from their formation, being easily borne away by every blast, be-
come

come the parents of a new progeny. As this plant is said to live only three years,* if, to the usual mode of weeding it out of lands in tillage, the attention of the farmer was directed to pulling off the flowers before the perfection of the seed, a reasonable hope might be entertained of lessening the quantity, if not of entirely extirpating it.* As it grows in considerable quantities, in the soils about the quarries of white lime-stone in this county, it is thought to have been carried from thence, as its appearance in many places is dated from the time of the first use of lime as a manure.

Caves.

No general mention having been made of the natural caves of the county of Antrim, I shall here point out those, which are most remarkable.

Those, which give name to the Cave-hill, that beautiful and picturesque mountain, which for

4 E

many

* The following course, if it lives only three years, would probably prove fatal to it: first, drilled potatoes, or turnips; second, barley, the ground well ploughed and picked; third, clover, to be mowed. By this mode the roots would be subdued, and the seeds prevented from ripening.

many miles around forms so striking a feature in most of our landscapes, are too well known to require description.

Another very curious and extensive cavity lies at Black-cave head, north of Larne, which is said to penetrate the basaltic rock, in which it is formed, to a considerable distance; and the sides of this are composed of pillars of great dimensions.

At Cushindun there was a cave, with a blacksmith's work-shop in it, formed of materials of a very different kind, being a kind of reddish sandstone.

Under the castle at Red-bay, is a cave of great dimensions; the roof and sides of it are formed of rounded siliceous stones, in a paste of sandstone; it opens to the sea, and affords, through the arch which it forms, at all times an interesting view, but particularly when the sea is high and agitated.

The cave under Dunluce castle is another noble natural apartment of the same nature, but exists in materials of a nature totally different from that at Red-bay, the walls and roof being of rude basalt. But the cave at Port Coan, though mentioned before, requires particular notice: its sides and roof are formed of round stones, imbedded in a basaltic paste, so hard as not to be broken without

without great difficulty; these stones again are formed of concentric spheres like the pellicles of onions, the whole composing a mass of most extraordinary appearance. As this cave is approached, the dyke, of which a drawing is given, stands on the left; behind is the rude basaltic precipice, in the face of which is the dyke from whence the other was detached; and beyond the cave, at no great distance, is the Causeway itself; so that four most distant varieties of basalt are displayed in a short space, each preserving the characteristic features of their formation as distinctly as if at the distance of many miles.

CHAP. IV.

ANTIQUITIES.

SECT. 1. *Cairns—Cromlechs.*

The antiquities of the east coast of Ireland, from Meath to the north sea, have so great a similitude, that to describe those of one district is (unless the minutiae of each object be entered into) to give an account of the whole: cairns, cromlechs, pillar-stones, raths or forts, and mounds of different magnitudes and forms, abound along the whole coast, and extend inland. The monastic and military remains are also similar, as well as the detached pieces, as arms, urns, and ornaments, which are occasionally met with. Of these monuments, the cairns have least the appearance of art or of contrivance, and are evidently the work of men in a very rude state of society. The most remarkable of those, as well as the most conspicuous, is that on Colin mountain, about three miles to the north of Lisburn; it seems like a point, when

when viewed from a distance, but is of considerable extent. It is formed of a number of small stones, piled up in a conical shape, and now nearly covered with a green sod, seeming to have its origin in the growth and decay of the grasses, which have taken root in the soil, caused by the decomposition of the stones by the moisture of the climate, in which they are situated. I have not heard of any attempt to open it, consequently nothing of its contents is known. Another of these monuments exists on Sleive True, west of Carrickfergus, and two on Colinward. Others may exist, of which I have not been informed.

Neither is the cromlech wanting in our catalogue of antiquities, though I think they are not so numerous as in the neighbouring county of Down; that near Cairngrainey is most remarkable, having twelve stones ranged from south-east to north-west, the western one near seven feet high; that to the east nearly level with the ground; this sloping position is common, and has given rise to the name. It is further to be observed, that the upper or flat stones composing the cairn, or, heap of the sun (which in the Irish language Cairn-grainey signifies) are each supported by three upright stones, in the same manner that the single cromlechs are.

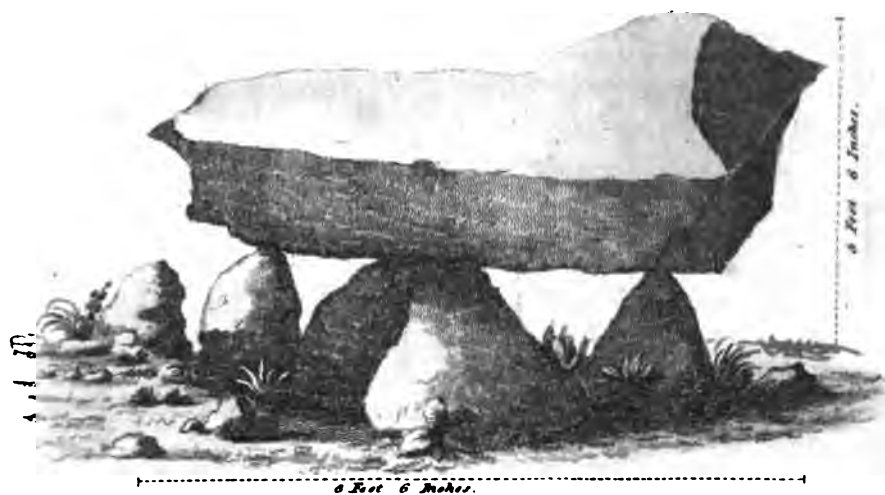
Near

Near these stones is a large mount, and several strengths different from those forts so common in every part of the county; these lie to the north-east of the road from Belfast to Templepatrick.

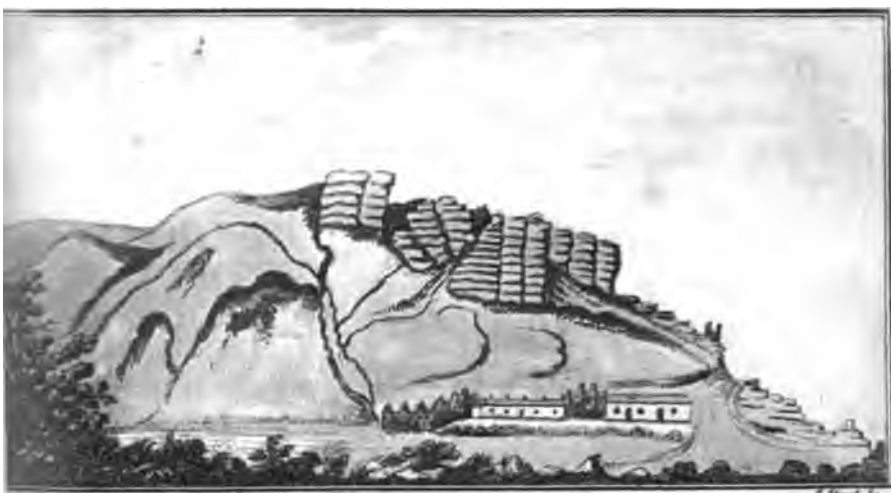
Of the cromlech, which stands on the lands of the Rev. Robert Trail, of Mount Druid, near Ballintoy, I have given a drawing; the principal stone is six feet six inches in length, by five feet six inches in breadth, and stands on four supporters, one at each end, the other two on each side; it had been surrounded by a circle of stones, the diameter of which was about thirty-three feet inside of the circle; many of these stones are now gone; those, that remain, are from one to two feet in thickness.

Another of these rude monuments stands at the northern extremity of Island Magee; this also is in a sloping direction supported by three large stones set upright, the inclination is to the east; the covering stone is above six feet in length, and at one end nearly equal to that in breadth; under it is one large stone lying flat; on the outside are six large stones upright in the earth, four of which stand on the north, and two on the south side; these stones are about three feet high.

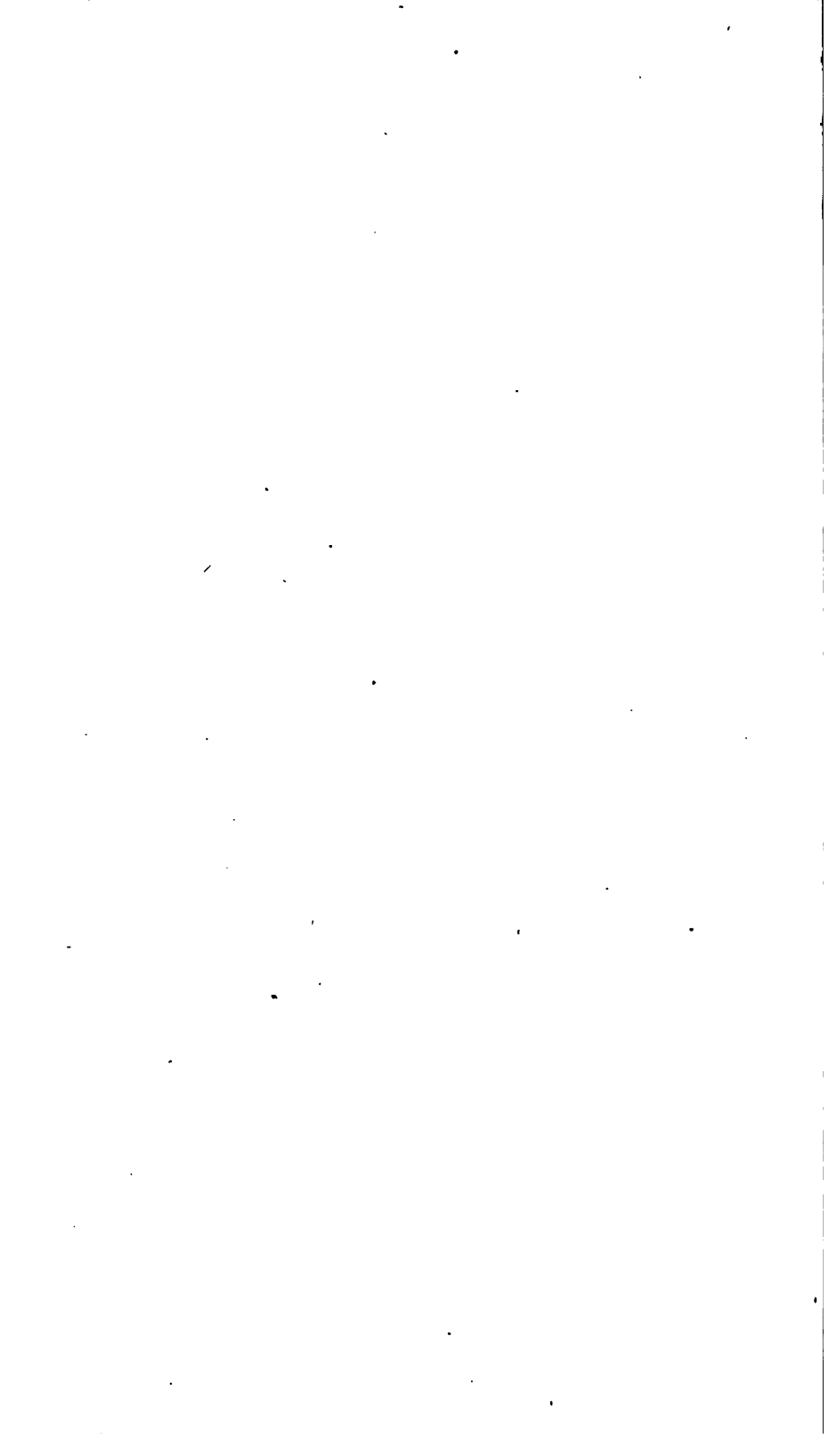
Hole-stone



CROMLECH in the Lands of the Rev R^d TRAIL of Mount David Parish of Ballinacoy.



View of the STRATIFIED SUMMIT of the CAVE HILL



Hole-stone, to the east of the road from Antrim to Glenavy, appears to have been also a monument of Druidical antiquity ; the remainder having been demolished, only one stone is now left.

SECT. 2. *Mounts, Forts, &c.*

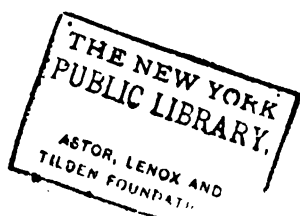
Of these ancient works, the county of Antrim contains every variety, that I have seen in any other country, and in great numbers. From a very accurate manuscript description of the antiquities of Killead and Muckamore, I find these parishes to contain no less than two hundred and thirty-seven forts of the lower kind, surrounded with one or more ramparts, and ten mounts, two of them containing caves or excavations, one of which is in the townland of Ballyhervey, and one in the townland of Dungonnel ; that one, called Donald’s mount, is a most beautiful specimen of that kind of earthen structure. But in a country, where every one is familiar with these remains of other times, it would be useless to describe them particularly. I shall therefore only mention a few that I have met with, that struck me as finer than others. At Dunethery there is a very noble one, which is planted ; also at Dundermot ; and a most curious
mount,

mount, with a square out-work, at Dunmacalter, in the parish of Culfeightran. Dunmaul fort, near Nappan, seems to have been cut out of the basalt rock, which hangs over the sea. At Cushindall is a mount, with a castle in it, probably a Danish remnant. And near Mr. Babington's, at Drumfare, on the Braid river, is one, that has a fine effect coming from Broughshane. At Camlent, Old-church, is another; and a curious one in a bog near Ballykenedy. That near Connor has out-works exactly resembling the mount at Dromore; and, in one near Carrickfergus, were found several Danish trumpets of a very old make.

Mr. Wright, in his Louthiana, says, these works do not extend much further south than the county of Meath, and not far to the west; they extend northward to the coast of Antrim, and whatever was their use, from the number that exist, they must have been the work of a great population, who certainly had either the incentive of safety, or of religion, to urge them on in their formation—probably they had both.

For the description and drawing of the following curious piece of Irish antiquity, found in the county of Antrim, I am obliged to my friend, General Vallancey.

To



Double Patera of Gold
PARAMON, and to the

5 Inches Diameter



atera of Gold

and to the

To the Rev. J. Dubourdieu.

Dear Sir,

I send you the drawing of a curious monument
Irish antiquity, that was lately sold to Mr. De-
nder, goldsmith, of Skinner-row, Dublin, by a
casant, who said he dug it up in the parish of
allymoney, in the county of Antrim; it is of
old, and weighs 19 oz. 10 dr.; its form is elegant,
and the workmanship well executed; and certainly
the maker was not in a state of savage barbarism,
arms usually and very improperly applied by
riters, when treating of the heathen Irish. I
call it a double *patera*, used probably in their li-
ations to the two chief deities of the heathen
ish, viz. BUDH, and his son PHARAMON,* and
so to the SUN and MOON. In the sixth volume
f my Collectanea there is an engraving of another

4 F

instrument

* "J'ai remarqué que les *Brames* (Bramins) aimaient à être
appelés *Paramanes*, par respect pour la mémoire de leurs ancêtres
qui portoient ce nom." (Bailly, Lettres à M. Voltaire.)

"*Pausanias* nous dit, que *Mercur*," le même que *Bulla* ou *Budda*,
un des fondateurs de la doctrine des *Paramanes* ou *Brames*, est appelé
Parammon." (Gébelin. Hist. du Calendrier Pref. p. 14.) Budh, accord-
ing to the *Singalese*, disappeared 542 before the birth of Christ.

instrument of this kind, beautifully executed, but not so large, nor so elegant in shape as this now described. Several, of smaller dimensions, have been found in various parts of Ireland. This drawing is the exact size of the original. Mr. Delander is the person, that sold the golden bracelets, found in the county of Roscommon, to the late Marquis of Lansdown for the sum of £1200. This patera was offered by Mr. Delander to several public bodies in Dublin, and to several noblemen and gentlemen for its weight; but, alas! such is the spirit and love for antiquities in this country, it was rejected by all;—it was at length sold to his neighbour, Mr. West, and is probably gone to the crucible.

When you quoted the old Irish word *indic*, for linen cloth, in the foregoing sheets, as a proof from whence the Irish derived the art, you might have added, my dear Sir, that the names of all the implements and materials, used in weaving, are mostly Phenician and Indian: some few are Arabic and Persian; as I have many years since shewn in the 12th number of my *Collectanea*, viz.

Anur, anuit, narrow coarse linen, sold in the south by the bandal or cubit, which is also the breadth of it, and hence called bandal-cloth.—In Arab.

Arab. *Anaet* cloth.—Hindoostanee, *ban-dzel*, a cubit.

Pers. *bandl*, a certain measure.

Beart, a weaver's loom. Pers. *berdi*, weavers' reeds; *berdu*, the beam; *bart-aften*, to weave.

To-caras, a weaver's reel.—Phæn. *tuh*, to weave.

Geabh, *geabhla*, the boll of flax.—Phæn. *gibhol*, was bolted.

Fuith, *faith*, linen cloth.—Pers. *futè*. Hind. *futè*, striped Indian cloth. Punico Maltese *fettya*, instrumentum textorium.

Faiths, (pron. *faish*) cloth.—Phæn. *phesheth*, flax, from *phush*, to luxuriate.—*Phachat*, cloth.

Faich, cloth.—Phæn. and Chald. *phekich*, glomus. *phekaris* linum. Chinese *phie* (nomen clavis, i. e. litteræ) pannorum et telarum panni (Fourmont.)

Kiert, cloth.—Pers. *Kerte*, a linen shift.

Oige, linen cloth. Phæn. *oigin*, a weaver.

Tanam, to weave—*Tana-doir*, a weaver, Hind. *tantee*.

Oigras, a weaver.—Phæn. *arag*.

Snath, (pron. *sna*) Arab. *sina*, *snatir*. Æthiop. *sara*, thread. Hind. *sun*, flax, hemp.

For-tain, the woof. Phæn. *tora*, &c. and many more. See Collectanea de Reb. Hib. No. XII.

I remain, Dear Sir,

Your obedient servt.

CH. VALLANCEY.

Ecclesiastical

SECT. 3. *Ecclesiastical Antiquities.*

Mr. Archdall, in his *Monasticon*, enumerates 48 establishments of this kind, and says that twenty of them are now unknown. But in reality the number, of which there are any remains or certain records, by which they may at present be traced, does not amount to one-half of those said to have existed in the county of Antrim. Of the religious house founded at Antrim, by a disciple of St. Patrick, in the year 495, there are no further records than 766.

Carrickfergus.—The foundation of a monastery here for Franciscan friars, who, from humility, called themselves friars minor, and also grey friars, from the colour of their garments, was supposed to be in the year 1232; but by whom it is doubtful, whether by Hugh de Lacie, Earl of Ulster, or by O'Neil. But the Earl of Ulster was buried there, in 1253,* as also Gerald Fitzmaurice and Richard de Burgh, 1408. Hugh Adam M'Gilmore, who had destroyed forty churches, and, amongst them, this church of Carrickfergus, was
at

* Dean Dobbs's papers; Archdall says in 1243.

at length killed in the oratory of the same church by the family of the Savages, who entered the place through the windows of the church, which he had enlarged by opening and destroying them, that he might take from thence the iron bars.

This monastery and its possessions were granted, at the suppression of religious houses, to Sir Edmund Fitzgerald; he assigned them to Sir Arthur Chichester, who erected a noble house, where the monastery stood.

Connor is now a village; it gives name to the bishoprick. Little is known of this religious foundation.

Glenarm.—A monastery was built here for Franciscan friars of the third order, (that is, they were neither conventuals nor observantines) in the year 1465, by Robert Bisset, a Scotchman. This monastery, and the lands belonging to it were granted to Alexander M'Donnell, ancestor to the Earls of Antrim. There are still some remains of this building on the bay of Glenarm.

Goodburn or Woodburn, near Carrickfergus.—A priory, dedicated to the Holy Cross, was founded here for Premonstratensian friars, who were called so from their order being reformed at Premonstrè, in the diocese of Laon, in Picardy; they were also called white friars. It is supposed to have
been

been founded by some of the Bissets, in atonement for the murder of the Earl of Athol, which obliged them to fly from their country. The last abbot resigned into the hands of Henry the eighth, the 1st of March, 1542, and retired to Island Magee.* At that time the abbot was in possession of certain lands around the priory, of the rectory of Entroia (Antrim,) and the tithes of sixteen townlands, belonging to the rectory of Killaboy in the Reuts, of the rectories of Crolille and Carmony, and of two townlands in Island Magee, viz. Ballypor magna and Ballypor parva.

Kells or Disert, four miles north of Antrim, and close to Connor.—A priory of regular canons was erected here, under the invocation of the Virgin Mary, by O'Brien Carrog, before the arrival of the English. Murtagh M'Annulowe, the last abbot, surrendered it on the 1st of February, 1542, being then in possession of the temporalities, as well as spiritualities of eight townlands circumjacent to the priory, of five rectories, and the tithes of Templemotragh, near Glenarm, and of Kildoran in Island Magee.

Lambeg, near Lisburn.—M'Donnell built a small monastery here, in the fifteenth century, for Franciscan

* Dean Dobbs's papers.

ciscan friars of the third order ; but I rather suppose it was a nunnery, as one part of the churchyard is even now distinguished by the name of the nun's garden.

Masserene.—A small monastery was founded here, in the fifteenth century, for Franciscans of the third order, by O'Neil. On the 20th of November, 1621, it was granted to Sir A. Chichester, Baron of Belfast, by the name of the Friary of Masserene.

Muckamore, two miles from Antrim.—In 550, a noble monastery was built here by St. Colman Elo, under the invocation of the Virgin Mary. This saint was afterwards bishop of Dromore. Some ruins are still in existence in the village of this name.

In 1183, the prior of this abbey was a subscribing witness to the charter granted by Sir John de Courcy to the abbey of St. Patrick, at Down.

Bryan Doyomahallon was the last abbot, and surrendered it in the thirty-second year of Henry the eighth being then seized of eight townlands, lying round the priory, viz. Ballymackemair, Ballyshane, Ochyll, Ballow, Tearogearye, Ballylaghe, Ballyestiene and of the manor, &c. of Masserene, the town or parish of Ballymohellan, two townlands near the woods of Dunmore and Kilwoode-

rag, and of the said woods, and of all the tithes in lower Clandeboy, and two parts of the tithes within eight parishes or granges in upper Clandeboy, (part of the county of Down,) two parts of the tithes of Magherscergan in the Reuts, and of Kilglarne in the Ardes, the rectory of Whitekirk, in Island Magee, and the tithes of a quarter of land, called Carrownaghan, in the county of Down. On the 3d of December, 1564, a return was made to queen Elizabeth, that the prior and all his monks were dead. This priory was granted to — Langford, and Sir Roger Langford was seized of it in 1630. The grange of Muckamore is mentioned in the visitation book of the diocese of Connor. This is reckoned at present a very ancient burying-place, and some ruins are still to be seen. Many years ago, it is said, two silver candlesticks were found here, and two golden tables about two feet long by fourteen inches broad, and various other articles, besides some money.

Of White Abbey, to the west of the road from Belfast to Carrickfergus, there are considerable remains, but no records. In Lord Macartney's papers, it is said to have been the daughter of some other religious house, not in that part of the country; as there was a monastery of Premontrant or white friars at Drieberg, in Scotland, and as this

was

was of the same order, probably it was from it that it took its rise, as was the case with Woodburn near Carrickfergus; it is much more likely that White Abbey was that named Druin La Croix, than the other, because there are accounts of the latter to 1326, whilst of the former there are none; for, a paper granting a lease of certain lands is dated from Woodburn, in the year abovementioned.

Dundesart.—In this townland, which lies in the parish of Killead, near Crumlin river, are the ruins of an ancient church or monastery, sixty feet long, and twenty-five feet wide, situated on a large fort, with a double intrenchment, faced in front with stones, and paved over the top, with two complete entrances, one north-west, the other south-east; in cleaning out the trench, was found an iron bow, and an arrow-head of steel, also a golden broach, six inches long, with a swivel on the top; several pieces of silver were also found, with a cross on one side, and an impression not intelligible on the other; as were several pieces of marble stones, one in particular shaped like a man's head and neck, and three stone basons (probably fonts) which contained about three pints each, and several pieces of metal of different descriptions. In the interior of this intrenchment was an ancient burying-place,

wherein were several human skeletons inclosed in oak coffins; others were found in the church and in the windows without any coffins, which gives reason to suppose, that it was levelled on the people in the inside, as there was a cannon ball found near the house, having first struck a stone before it entered it. A number of houses have been near this place.

* In the townlands of Ballykennedy and Caronavy, in the same parish, are the ruins of two other churches also. There is a tradition respecting the destruction of the churches in this barony of Masserene; that, in the rebellion of 1641, the rebels having got possession in one night of many of them, and having fortified themselves, it was necessary for the army to burn these edifices before they could be driven out. This may account for the unburied skeletons being found, as before mentioned, in the ruins of Dundesart.

Ballycastle.—Near this is an ancient building, called Bona Margy, which was founded in 1509, by Charles M'Donnell, for monks of the order of St. Francis, and may be reckoned among the latest monastic edifices erected in Ireland. The chapel is about one hundred feet in length, by thirty-four
in

* Manuscript Account of Killead.

in breadth; all the other buildings are in too ruinous a state, to allow of any accurate ideas of their dimensions; but the eastern gable is still in tolerable preservation, and adorned with well-executed devices in bas relief. This is the burying place of the Antrim family, who have put a new roof upon a small oratory, built over the ashes of the family by a former Earl of Antrim. Over the window is the following inscription, now almost illegible :

*In Dei, Dei paræque virginis honorem,
Nobilissimus, atque illustrissimus,
Randolphus Mc Donnell Comes de Antrim
Hoc sacellum fieri curavit, An. Dom. 1621.*

The situation of this place is very grand, commanding a view of the ocean, with the bold outlines of the rocks, that rise along the coast, and of the mountains, that surround it.

Raghery, or Rathlin.

This island, which forms a part of the county of Antrim, and diocese of Connor, had a monastery founded by St. Columba, who founded Derry in 546. Archdall records nothing remarkable of this,
except

except the ravages of the Danish pirates, who, in 790, destroyed every thing sacred and profane.— This was the first descent of these invaders on our coasts.

Linn.—A nunnery of this name is said, in the Monasticon, to have been founded in a spacious plain near Carrickfergus, of which St. Darerca, sister to Saint Patrick, was abbess. But this house is rather thought to have been at Glynn, near Larne, which was anciently called Linn, and where some remains of a chapel still exist. The abbey, with its lands, was granted to Sir Arthur Chichester, by James I. by the title of the chapel of Glynn. There was also in the parish of Larne an abbey of friars Cisterians of St. Augustin; it was dissolved, as others were, in 1542; and, by James the first, granted to Sir Arthur Chichester; but at present no vestiges remain.

Round Towers.

Of these buildings, the original use of which has given rise to such innumerable conjectures, there are four at present in this county, in different degrees of preservation; one at Antrim, one in Ram's island in Lough Neagh, one near the old church at Trummery, between Lisburn and Moira, and the remains of one in the parish of Armoy.

Armoy. Whatever, therefore, might have been the purpose, for which they have been erected; whether for watch-towers, for places from whence the people were called to prayer, or for places of penance, the greatest uniformity of structure is conspicuous in them all, as much so at least as is consistent with the different kinds of stone (for they are all of stone) of which they are constructed, and so much so that, as Mr. King truly says, "they all seem as if they had been built by the same hand;" they are always round; their diameter, at bottom, is generally about fifteen feet, or from forty-two to forty-eight feet in circumference; within, the diameter is seldom more than eight feet; they are from seventy to above one hundred feet in height; they have nearly the same thickness of wall; the door of each, also, is found at a distance from the ground, except where the earth has been raised; and there has never been found any means of ascending to the top, but by a ladder from floor to floor. In some instances there are abutments of stone in the walls all around, to rest timbers on for floors or stages; and every story has a little narrow loop-hole for light, or else a window. Four windows are also always found in the upper story, facing the cardinal points, and seldom any elsewhere. In their external form they are nearly alike, gradually diminishing from bottom to the top, and in most cases

cases covered with a stone conical roof. Mr. King, the latest writer on this subject, who is quoted above, thinks these towers were the habitations of the hermits known by the name of Stylites; but, though his arguments are plausible, they are not convincing, and he is much more successful in his assertion, that they are not of Danish origin, as no such buildings are known in any part of Denmark. Of the tower, which stands in the churchyard of Trummery, I have given a drawing, as also of the mount which stands near it. The mason-work of this tower is curious, consisting of two walls, an outside and an inside one, both formed of the round field stone, filled up between them with mortar and small fragments of flints and other stones; each wall, except in that mode, totally unconnected with the other, and scarcely a joint broke, with regularity from the bottom to the top of the building, which is about sixty feet high; at about one third of the height, the outward stone-work of the wall on one side is completely destroyed by time or violence, but the strength of the cement is such, that it is with difficulty a stone can be taken from its place. This tower is different from most other towers, being nearly of an equal circumference at the top as at the bottom.

The



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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

The tower at Antrim is in a much higher state of preservation than any of the others; it tapers curiously towards the top, and its roof (of flat stones) is very good. At the foundation, on the outside, are two circles of projecting stones; some feet above these is a door, small, and facing the north; there neither are, nor do there appear to have been, any steps to ascend to this door; the windows near the top are round, and, as usual, front the cardinal points; the door and windows are arched, and the stones used in the building are of coarse-grained basalt, and have been taken from a quarry on the high grounds, that lie at some distance from the town.

Ram's island, in Lough Neagh, about two miles from the shore, contains another of these buildings, more curious, from the circumstance of its being situated in an island, than from any other particular attendant on it, as in its general appearance and construction it does not materially differ from other structures of the same kind. The island contains about six acres,* and, with its tower, forms a very interesting object from the neighbouring grounds.

What

* Mr. Whittle, of Liverpool, has lately got this island, and has planted an orchard, and otherwise improved and ornamented it.

What remains of the tower at Armoy, coincides with the general description of these edifices.

SECT. 4. *Military Antiquities.*

Carrickfergus.

In the 11th number of the Collectanea, this place is said to have been distinguished by the name of Dun-sobarky, the impregnable fortress; its present name is derived from the circumstance, we are told, of Fergus having been drowned there. Carrick Fergus is the rock of Fergus; it is also frequently mentioned by the name of Knock-fergus.

If the castle of Carrickfergus was built by Hugh de Lacy in 1178, it must have been one of the first settlements of the English in this kingdom; for Pope Adrian's grant of Ireland to Henry the second is dated 1155; and Henry's licence to his subjects was in 1168; therefore, in ten years they must have established themselves there.

1234. In this year it is mentioned as one of the towns of Ulster, together with Armagh, Down, Ardglass, Newry, and Carlingford. The haven towns at the same period were Carrickfergus, Strangford,

Strangford, Ardglass, Carlingford, and Kilkeel.

1275. Before this year it must have had a charter; for there exists a letter from Edward the third, dated as above, to the mayor and commons, concerning a rebellion stirred up by some English and Irish.*

1315. It was besieged by E. Bruce, brother to the king of Scotland. He returned again in 1316, besieged it a second time, and took it. Bruce, after this, had advanced as far as Limerick, but, upon the arrival of Mortimer at Waterford, he returned in haste, and was defeated by Lord Mandeville on Maunday Thursday, and again on Easter eve. Lord Mandeville was killed.

Bruce returned once more to Carrickfergus, which he besieged on St. John's day; but, in 1318, he was slain in battle, with two thousand Scots, by John Maupas, who was also slain, and found dead on Bruce's body. This battle was fought at the Faughard, a most curious fort to the south of Jones-borough, near Dundalk.†

1333. The Earl of Ulster, Hugo de Burgh, the governor, was murdered by his own servants.

1343.

4 H

* Their names were Od. O'Neil, Rex de Kenelyou, Commoey, O'Katharan, Rex de Reach—five Mandevilles, and Wm. de Corrs.—Dean Dobbs's papers—from the town chest.

† Marlborough Chronicle.

1343. An order was sent to the treasurer of Ulster, concerning a salary of £ 40 per annum for the keeper of the said castle—*pro custodia prædicti castri*.

1387. It appears, that about this time the town was entirely burned by the Scots (*nuper totaliter combusta*); for there exists an answer from Richard the second, dated in the tenth year of his reign, to the mayor and burgesses, who had prayed for relief.

1390. In this year, an order was sent to the justiciary, John de Stanley, respecting the safe keeping of the castle, which was in a miserable state; describing also the wretched situation of the country, upon account of the incursions of their enemies the Irish.

1406. Henry the fourth, by his warrant, in consequence of the danger, in which the castle was from enemies without and want of supplies within, appoints a constable of the castle, with a salary of £ 40, to be paid half yearly. To this office Edmund, son and heir of Roger Mortimer, was appointed; Galfridus Bentley to exercise the office until Edmund, then a minor, should be of age. *

1481.

* It was enacted in the reign of Henry the 7th, that one born in England should be constable of Carrickfergus and Green castle.

1481. A commission was given to the mayor of Carrickfergus and others, to enter into a league and friendship with the Lord of the Isles, Earl of Ross, who had usurped the sovereignty of the Western isles (Hebrides) from the kings of Scotland. There was a constant intercourse, sometimes amicable, sometimes hostile between the Scots of the main land, the Scots of the Islands, and the inhabitants of the coast of Antrim. The distance between the two countries is so short, that whether for the purpose of depredation, or of trade, part of a day was sufficient for the passage. The hostile expeditions were generally of a private nature, in which the respective governments did not take any share; but sometimes they were obliged to interfere. This appears to have long continued so, by a letter to Sir John Perrot from James of Scotland, dated 1585, in which he promises in future to restrain his* islanders, who were accused of acts of piracy against some merchants of Carrickfergus. But what the Scots seem to have had in view was a permanent settlement, which, having got footing by a marriage of one of the Mac Donnells, they in the end accomplished by aid from their own country, extending themselves
over

* At this time the usurping Lords were put down. — From one branch of this family the Antrim family are descended.

over the whole coast, and having one part of Carrickfergus entirely to themselves, which is called the Scotch quarter.

1567, A survey of the castle was taken, by which it appears that it was in a very ruinous state. The principal buildings were nearly the same as they are now,*

1569 is the date of Queen Elizabeth's charter to the corporation. The subsequent grant by James the first, through Lord Chichester, was obtained in 1610. And this is the present existing charter. In it he pays the corporation, &c. many compliments on their utility, loyalty, and courage, in defending and assisting the government upon all occasions, confirms their former privileges, and grants them additional ones.

During the whole period of Tyrone's rebellion, this place was the head-quarters of the English forces in the north of Ireland, as may be seen from Fynes Moryson's history of that deplorable time. Sir Arthur Chichester was long governor of it, from the services he did in that capacity, and in the other parts where he was employed. After the death of Lord Mountjoy he was appointed Lord Deputy; * having," in Moryson's words,

* *Quintus*.

words, "enjoyed that place many years, beyond all example of former times."

1639. A plan to deliver up the castle to the insurgents of Scotland was defeated by the Earl of Strafford.

1640. A large army was assembled here to oppose the Scots.

1641. Sir Phelim O'Neill, wishing to get possession of the castle of Carrickfergus, was defeated, on his way there, at Lisburn, Nov. 28, by Sir John Rawdon, who arrived in the evening of the 27th, having left London on the intelligence he received of the situation of affairs in the north of Ireland.

1642. April. Four thousand Scotch auxiliaries, according to a resolution of the parliaments of Great Britain and Ireland, came over to assist against the Irish rebels, and took possession of Carrickfergus.

1648. General Monk surprised and took their general, Munroe, prisoner, and sent him to England.

1649. Early in this year it surrendered to the Earl of Inchiquin; and General Monk was taken prisoner. Nov. 2, of the same year, the town and castle surrendered to Sir Charles Coote.

1689. Aug. 13. Duke Schomberg's fleet anchored in Carrickfergus bay. He landed at Bangor
on

on the 14th; the garrison of Carrickfergus burned the out-works, as they apprehended a siege. On the 22d, the duke having marched his troops through Belfast, from which place the enemy retired, invested the place. On Sunday the 25th, breaches being made, the town after some parley surrendered.

1690. June 14, King William landed at Carrickfergus.

1760. Thurot landed Feb. 21st. with about one thousand men, and was bravely resisted by less than two hundred of the 62d foot, mostly recruits, who, under the command of Colonel Jennings, retired to the castle after having annoyed the enemy on their approach. The French attempted to force the gate of the castle, but were beaten back; the garrison, however, was obliged to surrender, which they did on honourable terms, having expended all their ammunition. Thurot wished to have landed at White-house, to surprize Belfast, but the general opposed this, not chusing to leave a garrison in his rear. He re-embarked on the 29th of the same month. His squadron, consisting of the Bellisle, of 44 guns, Le Blond, of 32, and Terpsichore of 26, were afterwards all captured off the isle of Man, by Commodore Elliot, after an engagement of one hour and a half, and Thurot was
killed

killed. At this time the most laudable spirit of resistance to the invaders was shewn by all ranks of people, who marched towards Carrickfergus in numbers, with whatever weapons they could seize. The different corps of militia and volunteers upon this occasion mustered every man, from Antrim town, and from Armagh.

Green Castle, Olderfleet, &c.

Of Green castle, which lies to the west of the road between Belfast and Carrickfergus, I can only say, that in the 19th of Henry the seventh an act was passed, that none but an Englishman should be constable of it or of Carrickfergus.

* Olderfleet castle, the ruins of which are to be seen at the extremity of the peninsula, which forms one side of the harbour of Larne, was probably built by the Scotch family of the Bissets, who were once in possession of that place and the country around it, given to them by the favour of Henry the third. John Bisset, who died in the reign of Edward the first, had large possessions there; and under Edward the second Hugh Bisset forfeited many

* Olderfleet castle was defaced in 1598.

many of them by his rebellion. These lands were afterwards claimed by James M'Donnell, Lord of Cantire, who claimed them in right of the Bissets. But Angus M'Donnell, son of James, after repeated defeats, was obliged to submit to Queen Elizabeth, and, to receive this territory, to hold it at her pleasure on these conditions, that he would carry arms under none but the kings of England and Ireland, and pay a certain number of cattle and hawks* annually. This was formerly considered as an important fortress against the attacks of the Scots; and, in 1569, Sir Magus Hill was governor of it. After several changes, this castle was granted to Sir Arthur Chichester, in 1610, by James the first. It was here that Bruce landed in 1315, before he began his ravages, which were attended with such dreadful consequences to the English settlers.

On the isle of March, which lies on the coast of Island Magee, are the ruins of a small square castle; and near the entrance of the same peninsula are the remains of Castle Chichester, situated most beautifully upon that bold shore.

Considerably to the north of this lies Red bay
castle

* Camden's Britannia. He always calls the M'Donnells M'Connell.

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DUNLUCE CASTLE from the WEST.



castle, now in ruins. The caves at this place deserve particular attention; the paste and stones, rounded by water, which form the roof and walls of them, are so different from the other stones and rocks in the vicinity.

At the north side of Cushindall are some remains of another castle, called Court Martin: it is said to have been built by a Martin M'Owen, and stands upon a mount, which is thought to be an indication of Danish origin. Whatever it was, it is now reduced to a very small remnant, parts of it having been carried away to assist in more modern structures.

Near the northern coast, several old castles, many of them being very difficult of access, must have been places of considerable strength before the use of artillery. Of these, Dunluce is the most remarkable, both for its size and situation. "At first sight it only presents an unseemly pile of ruins, like those of a village destroyed; but, on a nearer approach, its situation becomes truly striking, and indeed majestic, and particularly when viewed from the sea shore at its base. Its position is one of the boldest, and gives a degree of grandeur to the ruins, which, in a less commanding situation, might, perhaps, pass unnoticed." The mansion and offices

are situated on the main land ; their remains are very extensive, and are divided from the fortress by a deep cut in the rock, on which the castle is placed. It projects into the sea, and has the appearance of having been split off from the cliff; over the chasm lies the only approach to the castle, along what is now a narrow wall, but what was probably one side of a bridge which joined it to the land, as, on examination, another wall appears to have run parallel to it. The walls are built of columnar basalt. Doctor Hamilton says, the original lord of this castle was an Irish chieftain called *M'Quillan, of whom little is known, except that, like most of his countrymen, he was hospitable, brave, and improvident; unwarily allowing the Scots to grow in strength, until they contrived to beat him out of all his possessions. Sorley Buy (yellow Charles) brother of James M'Donnell, who had possessed himself of the Glynns, made himself by some means master of this place, till the Lord Deputy, Sir John Perrot, taking Dunluce castle, their strongest fortress, situate on a rock, commanding the sea, and separated

* This must be the same family called by Camden Mac Gillies. A lineal descendant of his now lives near Silver stream, just by the road from Belfast to Carrickfergus.

parated from the land by a deep ditch, drove out him and his followers. The particulars of this business, as extracted from the life of Sir John Perrot, may be acceptable to the reader.

“The castle had in it a strong ward, whereof the captain was a Scotchman, who, when the Deputy sent to him to yield, refused a parley, and answered (speaking good English) that he would keep it to the last man; which made the Deputy draw near thither, and plant a battery of culverins and cannon before it, which being brought by sea to Skerries (Port Rush) the Lord Deputy caused to be drawn thither (being two miles from Dunluce) by force of men, wherein he spared not the labour of his own servants; and, when small shot played so thick out of the fort, that the common soldiers began to shrink in planting the artillery, the Lord Deputy made his own men fill the gabions with earth, and made good his ground, until the ordnance was planted, and the trenches made. This being done, the Lord Deputy himself gave fire to the first piece of ordnance, and discharged it, which did no great hurt; but shortly after, it being better shaked, the next morning (after that they had over night felt a little the force of the battery) they sent unto the Lord Deputy to be received unto mercy, whereunto he condescended, the
rather

rather because he would save the charges of repairing again that place, which otherwise he must have beat down, and for that he would not spend the provision, weaken the forces, and hinder the rest of the services then intended, by lying long before one fort; and therefore he granted them life, and liberty to depart."

This fort was afterwards lost by the treachery of its governor, who is thus recorded by the same biographer. "Withall, there happening an accident of the loss of Dunluce (which the Deputy had now, and placed a ward therein) he advertised the same unto the privy council after this manner. When he first took that pile, he placed a pensioner, called Peter Cary, to be constable of it, with a ward of fourteen soldiers, thinking him to be of the English pale or race; but afterwards found that he was of the Carews in the North. This constable, reposing trust in those of his country and kindred, had gotten some of them unto him, and discharged the English soldiers, unknown to the Deputy: two of these, having confederated with the enemy, drew up fifty of them by night with ropes made of withies. Having surprised the castle, they assaulted a little tower, wherein the constable was, and a few with them. They at first offered them life, and to put them in any place they would desire,

desire, (for so had the traitors conditioned with them before); but the constable, willing to pay the price of his folly, chose rather to forego his life in very manly sort, than to yield unto any such conditions, and was slain."

"This transaction happened about the year 1585. But the Deputy sending against him Merriman, an experienced officer, who slew here the two sons of Jas. M'Connell (M'Donnell) and Sorley Buy's son Alexander, so harrassed him, and drove off his cattle, which were his only wealth (he having 50,000 cows of his own), Sorley Buy surrendered Dunluce, went to Dublin, and in the cathedral made his submission. After thus being received in favour, he abjured all allegiance to foreign princes, and, by Queen Elizabeth's bounty, had four districts given to him, called toughs; viz. from the river *Boys to Ban Dunsevirg, †Loghhill and Ballymonyn, with the government of Dunluce castle, for himself and heirs male of his body, to hold of the kings of England, on condition, that neither he nor his men, nor their descendants, should serve any foreign prince without leave; that they should restrain their people from ravaging,
furnish,

* Bush, I suppose;

† Loughguill.

furnish, at their own expense, twelve horsemen and forty footmen for forty days in time of war, and pay the king of England a certain number of cattle and hawks annually."

On the same coast lie Dunsevvic, and some other old castles, built in situations very difficult of access, but of whose histories nothing is known; all these are in the tracts of country granted to the Antrim family, but now in the possession of other proprietors; they were probably erected about the same time, and with the same intentions, as the castle of Dunluce.

In the internal parts are also many other remains of military antiquities; near one of these castles, on the borders of Loughguill, Lord Macartney built his retreat, which, after it, he named Lissanoure.

Shanes Castle, the venerable seat of the O'Neils, and Castle Upton, are the only mansions of this kind at present habitable in the county. Shanes Castle, formerly also known by the name of Edindefearick, was *wardable in 1598; but, at what time it was built, I am not informed. This place has at different times undergone many alterations; but

* Wardable, capable of defence.—Manuscript account of Ireland. Dean Dobbe's papers.

but the improvements, that have been lately made, and are now making, joined with its bold situation on the shore of Lough Neagh, and backed by a demesne and park of 1500 acres, covered in many parts with the noblest trees, and enlivened by the river Main, which flows through it, must, on the whole, constitute it one of the finest things in any country. Offices, and a garden, suitable to the whole design, have been some time finished.

Castle Upton, formerly Castle Norton, was built by Sir Robert Norton, in Queen Elizabeth's reign. It stands in the beautiful valley of the Six-mile water, and close to it is the village of Templepatrick. Though the grounds around the castle are flat, the hills rise on each side, and with the stately trees, that adorn the lawn, form altogether a charming scene. Offices of every denomination have been erected adjoining the mansion, all in the castellated stile, which assist in completing the whole. The same Sir Robert Norton was the builder of Castle Robin (so called after him) which stands near the summit of the White mountain, two miles north of Lisburn. The walls now standing are 84 feet long, 36 feet wide, and 40 feet high; near it is a fine mount; the mason-work is very rude, scarcely having a joint broke in any part, but the quoins are good.

At

At Portmore, near the Little Lough in Ballynderry, are some ruins. The castles, towers, garden walls, and stables were built by Earl Conway in 1664; the ancient garden wall is yet standing, with the remains of a bastion, and part of the stables, the brick, of which the latter were composed, as good as at the first moment. The stables were 140 feet in length, 35 feet in breadth, and 40 feet high. There were marble cisterns to pump the water into, and accommodations for two troops of horse. There had been an old castle there before this period. Here was the residence of Jeremiah Taylor during the Usurpation.

SECT. 5. *Detached Pieces of Antiquity.*

A peasant walking near Ballycastle, beside a rivulet, on the 20th of June last, observed a glittering hook of yellow metal projecting from a part of the bank, where the earth had been recently washed away by the current; on stooping to pull it out, he found it to be the extremity of a rod, thirty-eight inches long, free from rust, and of a bright straw colour; each end was terminated by a narrow hook, inflected in contrary directions;

directions; these hooks are massive, about two inches in circumference, and about two inches below the neck of each; the rod was divided into three distinct virgæ, which were closely twisted together in the manner of a toasting fork; the hooks are not included in the length of the rod, which, if extended in a straight line, would measure forty-two inches.

Unacquainted with its value, the peasant suffered it to be used as a bauble by his children, until his attention was raised by a person offering more for it than it was apparently worth; he then with some difficulty wrenched off one of the hooks, and sent it to a gentleman in Ballycastle, who, on trying it with aquafortis, found it to be entirely of pure gold, and to weigh (in air) twenty ounces and a half avoirdupoise.

The workmanship, though neat, is simple; it is void of all those embellishments so commonly used in gold and silver ornaments of the middle centuries; it bears no religious symbol, and its original purpose remains for the skilful antiquarian to decide.*

4 K

Near

* This account, extracted from the Belfast Magazine, was published by the Rev. L. A. Conolly, of Ballycastle.

Near Soldierstown, a finely-wrought piece of gold, shaped like a gorget, was found several years ago; it was very thin, simply ornamented, quite flexible, and of the purest metal. Stone hatchets of various sizes have been met with in several places; the greatest numbers, that have been found together, were near Ballintoy, which might give rise to the idea, that a battle had taken place on or near the spot; and arrow-heads frequently occur, made of flint. In some of them the work is as rude as possible; in others they are formed with a degree of neatness and accuracy, that bespeak a superior skill, the barbs being as nicely cut as if they were formed of metal. Brazen spear-heads are sometimes turned out of the ground; and a brazen trumpet, supposed of Danish origin, was dug out of a mount at Carrickfergus. By the Rev. Robert Trail I was favoured with a sight of a curious vessel, with a handle and spout like a coffee-pot, with three legs, and formed of a kind of brassy metal; it is eight inches high, and at the broadest part or belly four and a half; it was found in the townland of Ballintoy, in a hole of a rock. Several other antiques, supposed of gold, were found at the same time, but not recovered.

Two urns were also found in the same parish, in a lime quarry, about two feet under ground; the first of these is 12 inches high, by $11\frac{1}{2}$ in the broadest part of the swell; the other only three inches by four; the workmanship of both very rude; the attempts at ornament only a few parallel scratches, and made of dried clay, from appearance not having been baked. Four others were found near them; all were laid on their mouths, and all contained the remains of bones evidently burned. Each was included in a rude case of stones.

From a manuscript description of Ireland, in the possession of the late Dean Dobbs, supposed to have been written in 1598.

The countie of Antrim stretcheth from the river of Cragfergus to the river of the Bann, and containeth these countries, viz. North Clandeboy, Island Magee, Brien Carrough's country, the Glynnnes, and the Rout.

North Clandeboy is for the most part a plain country, being in length from the river of Belfast and Cragfergus to the Rout, and in the breadth from the Glynnnes to the great lough called *Eagh*, otherwise called Lough *Sidney*. This land was given by the queen,

queen, by letters patent, to Sir Brien Mac Phelim's sonnes. Notwithstanding by a division made by Sir John Perrot, the one moiety thereof was allotted to Hugh Mac Phelim's sonnes, whereby great dissention fell out between them; and several slaughters on both parts hath been committed. The principal followers in this country are these, the Mac Ynes, Mac Quillens, Ownilechabees, Dawmans, and Bertiers. The forces they are able to make are eighty horsemen, and three hundred footmen.

Island Magee is a portion of land within five miles of Cragfergus, almost environed with the sea; the head land thereof maketh the haven of Olderfleet. It is five miles long, but little more than a mile broad, all plain, without any wood, very fertile. It is all waste at this present. It is granted in lease by the queen to one Savage, one of the Earl of Essex his men. The inhabitants thereof are the Magies, from whom it hath the name. It is contributory to the lands of Clandeboy; but the right belonging to the queen's castle of Cragfergus.

Bryen Carrogh's country was a portion of Clandeboy, but won from it by a bastard kind of Scotts, of the sept of the Clandonnells, who entered the same, and yet do hold it, being a very strong piece of land, lying upon the north side of the Bann.

The

The name of the now captain thereof is *Bryen Carroggh*, who possesseth also another piece of the country upon Tyrone side upon the Bann, for which he doth contribute to O'Neill, and for the lands on the north side, to the lord of that part of Clandeboy.

This man, by reason of the fastness and strength of his country, having succour on each side of the Bann, is so obstinate and careless, as he never yet would appear before any deputy, but yealdeth what relief he can to the Scotts. His force in people is very small; he standeth only upon the strength of his country, which indeed is the fastest ground of Ireland.

The Glynnnes is a country so called, because it is full of rocky and woody dales; it stretcheth in length twenty-four miles on the one side, being backed by a very steep and boggy mountain, and, on the other part, with the sea; on which side there are many creeks between rocks and thickets, where the Scottish gallies do commonly land. At either end are very narrow entries and passages into the country, which lieth mostly opposite to Cantyre, from which it is eighteen miles distant.

The countrie of the Glynnnes containeth seven baronies, whereof the Isle of Raghlin is compted half a barony: The names of the baronies are these: Larne, Parke, Glenarm, Red Bay, (where Randall,

now lord of the country, has his residence) Carie, and Mowberry. This country of the Glynnnes was possessed by Agnes Mac Connell, (M'Donnell) who enjoyeth them at this present. These were sometime the inheritance of Baron * Misset, from whom it is descended to a daughter, who was married to one of the Clandonnells in Scotland, by whom the Scottish now make their claim to the whole, and did quietly possess the same for many years; till now of late, being spoiled of their goods, they were wholly banished into Scotland; but now again the country, by instructions from the queen, was left to Agnes *Mac Connell* and his uncle *Surleboy*, to be holden from her and her heirs and successors for a certain rent yearly payable. The force of the countrie is uncertain, for that they are supplied, as need requires, from Scotland with what number they list to call for, by making of fires upon many steep rocks hanging over the sea.

The auncient followers of this country are these. Some few of the Missets remaining, but in poore estate, the Magies, O'Nowlanes, Mac Nygells, Mac Aroulbyes, Mac Carnochs, and the Clanacasters, who are by original Scottish; and all of them are most desirous to live under the Scotts, because
they

* Bisset.

they do better defend them, and less spend them, than the Irish doth.

The Route is a pleasant and fertile country lying between the Glynnas and the river of Bann, and from Clandeboy to the sea. It was sometime inhabited with English; for there remain yet certain defaced castles and monasteries of their building. The now capten, that maketh claime to it, is called *Mac Guillin*, (the posteritie as is thought of a Welsman,) but Sir *James Mac Surley* hath wholly expulsed him, and driven him to live in Knockfergus, where he remaineth in a very poore estate. The chiefe house is called Dunluce, standing upon a rock in the sea shore, where the said Sir James hath his residence. The chiefe followers and inhabitants of the countrie are the O'Furries and the O'Quinns, who dwell upon their lands, and yealde rent and service to the aforesaid Sir James. This country is able to make 140 horsemen, and 300 footmen.

Carickfergus is the only town in the shire, upon the river, 3 miles broad over against the towne, walled partly with stone, and partly with sodds. There are in it two wards; the one in the castle, in the south end of the towne, the other in the abbye, in the north end thereof. This towne is governed
by

by a mayor and two sheriffs; and at this day there are but 16 freemen of this towne.

Castles wardable at this day.—Belfast, 8 English miles up the river from Carrickfergus, where the passage is over the river at low water.

Edenduffee Carrick, near Lough Eagh.

Castles defaced.—Olderfleet, Glanowre, Castle Marteen in the Route.

The County of Downe.

This shire containeth all the counties between the haven of Carlingford, and the bay of Knockfergus, viz.

The lordship of Newrie, lordship of Mourne, Evaghe (all Magennis's country), Kilulto, Kilwarlin, Kinalarty, Clanbrassel Mac Coolechan, Le Cahell, Duffrin, Little Ardes and Great Ardes, South Clandeboy.

The lordships of Newrie and Mourne are the inheritance of Sir Nicholas Bagnal, who at his first coming thither found them almost waste, and Shane O'Neill, dwelling within less than a mile of the Newrie, at a place called Feidem, suffering no subject to travel from Dundalk northward:

ward: but, sithence the building and fortifications made there by the said Sir Nicholas, all the passages were made free, and much of the country next adjacent reduced to reasonable civility; till this late rebellion of Tirone hath stopped again all the said passages, and laid the country in a manner waste, as it was in the said time of Shane O'Neill.

In the country are few gentlemen of name, the whole inhabitants being tenants to Sir Henry Bagnall.

Eveagh, otherwise called Magennis's country, was lately governed by Sir Hugh Magennis, the civilest of all the Irish in these parts. He was brought off by Sir Nicholas Bagnall from the bonnought of the O'Neill, to contribute to the queene, to whom he did pay an annual rent for his lands, which he took by letters patents to hold after the English manner for him and his heirs male — so as in this place only of Ulster the rude custom of thanistship was taken away. But this old knight being dead, his son hath succeeded, who being a young man hath joined himself with Tirone, his brother in law (for Tirone hath to his wife the sister of this Magennis) and thereby he hath cast away his father's civility, and returned to the rudeness of the country. Magennis is able to
 4 L. make

make eighty horsemen, and near two hundred footmen.

Kilulto is a very fast country, full of wood and bog. It bordereth upon *Lough Eaghe*, and *Clanbrassell*. The captain hereof was one *Cormack Mac Neille*, who likewise was brought by Sir *Nicholas Bagnall* from the bonnought of O'Neill to yeald to the queene. But at this present the captain thereof is *Bryan Mac Art*, brother's son to the earle of Tyrone. He is able to make twenty horsemen, and one hundred and sixty foot and kerne.

This country, before the barons' wars in England, was possessed and inhabited by Englishmen, and there doth yet remain an old defaced castle, which still beareth the name of Sir *Miles Tracie*.

Kilwarlin, bounding upon *Kilulto*, is a very fast woodland; the captain thereof was one *Mac Roric*, and sometimes did contribute and yeald to *Claniboy*, and after reduced to have dependance upon the queene. But at this present, the earl of Tyrone hath given this country to one of his coosens named *Owen M'Hugh*. This country is able to make twenty horsemen, and about one hundred footmen.

Kinelcartie, otherwise called *Mac Carianey's* country, is likewise a woodland and bogg; it lieth between

Kilwarlin and Le Cabell. The captain hereof is called *Achaly Mac Cartan*, and did yeald to the queene, but now adhereth to the Earl of Tyrone, as one of O'Neal's vassals. He is able to make two hundred and sixty footmen, but few or no horsemen, by reason that the county is so full of woods and boggs.

Clanbrassel Mac Coolechan (so called for a difference betwixt it and one other country of the same name in the county of Armagh) is a very fast country of wood and bogg, inhabited with a sept called the O'Kellies, a very savage and barbarous people, and given altogether to spoils and robberies. They do contribute, but at their own pleasure, to the captain of Claudeboy. They can make but few horsemen, and but one hundred and sixty kearne and shot.

Le Cabell, is the inheritance of the Earls of Kildare, given to his father and mother by Queen Mary, at their marriage, and the earl's restitution to his blood and lands, in place of some of his living given away to others by patent by king Henry the eighth, in the time of his attainder. It is almost an island, and no trees in it. In it is the bishop's seat, called Downe, first built and inhabited by one *Sir John Courcay*, who brought
with

with him sundry English gentlemen, and planted them in this country, where some of their posterity yet remain. Their names are, Savadges, Russels, Fitzimmons, Audlies, Jordans, Bensons.

Duffrin, sometime the inheritance of the *Men-devilles*, and now appertaininge unto one White, a mean gentleman, who is not of power sufficient to defend and plant the same; therefore it is usurped and inhabited by the neighbours. This country is for the most part woody, and lyeth upon the lough called *Lough Coyne*, which issueth into the sea at the haven of Strangford.

This lough is farr navigable within the land, wherein are divers isles, and in some of them strong castles. This country is able to make one hundred and twenty footmen, and twenty horsemen.

Little Ardes lieth on the north side of the river Strangford, a fertile champion country. It is the inheritance of the Lord Savage, who, being not able to withstand the violence of the O'Neilles, is constreyned to take what they will give him.

There are besides, dwelling there, certain ancient freeholders of the Savages and Smithes, able to make among them all thirty horsemen, and sixty footmen; but of late, being spoiled by their neighbours,

neighbours, some were compelled to remove; some others, that know not whither to go, have joined themselves to the enemy.

Great Ardes is almost an island, a champion and fertile land, and now possessed by *Neil Mac Bryan Flain*; but the ancient dwellers there were the *O'Guillemers*, a rich and strong sept of people, always followers to the *O'Neills* of *Clandeboy*.

The force of the inhabitants, now dwelling there, is sixty horsemen, and three hundred footmen.

South Clondeboy is for the most part a woodland, and reacheth from the *Duffryn* to the river of *Knockfergus*. The captain of this tract is *Neill Mac Bryan Flain*; his chief house is *Castle Reagh*. The country is able to make forty horsemen and eighty footmen.

Townes in the County of Downe, viz.

The Newrie, Downe, Ardglass, all unwalled, and without any privileges of a corporation.

Castles in the said County.

Green Castle, near the barr of *Carlingford*, upon the sea.

Dondrom,

Dundrum, in the bottom of the bay, that divideth *Lecahel* from *Evesagh*.

The castle of the *Narrow-water*, which keepeth the river, that goeth to the *Newrie*, passable.

Strangford, *Ringhaddy*, *Scattery*, *Castle Reagh*, within the isles of *Lough Coyne*.

This countie bath the sea to the east, the county of *Armagh* to the west, the haven of *Carlingford* and that river to the south, the countries of *Brasilegh*, *Clancan*, and *Lough Eagh* to the north.

APPENDIX.

No. I.



A
LETTER
ON
ZEOLITE AND OCHRE,
BY
THE REV. DR. RICHARDSON.

DEAR SIR,

OUR friend, Mr. Mussenden, brought me your letter, together with some specimens of Antrim fossils, which you are so flattering as to request my opinion upon.

They are chiefly zeolites, imbedded in basalt, and reddish stones, commonly called ochre; but I apprehend them to be pure basalt, which has passed into that state by some chemical process of nature, with which we are unacquainted.

There are not any fossils more abundantly dispersed over the whole face of the county of Antrim than these two, nor are there any which

have occasioned more controversy among naturalists. The importance of them, in the question of the volcanic origin of basalt, has given them a consequence, to which they do not seem otherwise entitled by any of their properties yet discovered.

The county of Antrim seems to me, with very little exception, to be formed by accumulations of basalt strata; this fossil, therefore, must necessarily make a prominent feature in the natural history of the county of Antrim; it would give me great pleasure to be able to throw any new light upon the subject; but, I must confess, my knowledge of the origin of basalt is purely negative, and I may say of this fossil, what Cicero pronounces more generally, "*Omnibus fere in rebus, maxime autem in physicis, quid non sit, quam quid sit, facilius dixerim.*"

Where we are precluded from acquiring certain knowledge, it is often amusing to trace the wild opinions, that have been started by naturalists, upon subjects familiar to us; and no country has given rise to more fanciful theories than our county of Antrim.

About thirty years ago, we were surprised at hearing from every gentleman, who came to see the Causeway, that it was produced by a volcano;
that

that all the stones and rocks, with which our country abounds, were pure lava; that the beautiful columnar groupings, so numerous in its northern parts, were all crystallized lava; and that, at some early period, the county of Antrim was desolated by successive torrents of glowing lava.

It was in vain we alledged, that our country had none of the features, by which volcanic countries are distinguished, and that exclusive of basalt, which they chose to call LAVA, it did not afford a single volcanic production. We were told in reply, that the question was decided, and that every naturalist on the continent admitted BASALT and LAVA to be synonymous terms; and, upon further enquiry, we found, that what we were told was true, and that the volcanic origin of basalt was almost universally admitted.

The volcanic origin of basalt, thus supported by plausible facts, was received for some time without contradiction; but, at length, many naturalists began to discover its insufficiency; and its incompatibility with facts was shewn in several instances, but in none more than the zeolite, so often found in basalt in other countries, and with us, over the whole face of the county of Antrim, imbedded in the same material.

A fossil

A fossil, so abundantly dispersed through our whole county, and which has been deemed by naturalists of so much importance, in a question intimately connected with the natural history of Antrim, is entitled to a very particular attention.

Zeolite was, I believe, first discovered by Cronstedt, and obtained its name from the effervescence it makes when exposed to a strong heat; this arises from the quantity of water it contains, asserted by Mr. Kirwan to be from one to three-eighths of its whole weight.

It is always in the form of minute crystals, of which M. Haüy (National Institute, vol. first) enumerates four distinct species; with us it is generally found in very delicate spicula, diverging from, or converging to, a centre.

Lastly, it is fusible in a very moderate heat, as Cronstedt himself tells us.

Each of these properties separately shew, that the substance, in which zeolite is imbedded (always basalt) could not have been exposed to a considerable heat, and, still less, fused like lava.

But in all basaltic countries zeolite is found, as in the county of Antrim, copiously dispersed through most masses of basalt. It therefore becomes absolutely necessary for those, who pertinaciously adhere to the opinion, that all basalt was
once

once fluid lava, to account for the introduction of a substance into all parts of it, which from its properties above stated, could not for a moment have sustained the heat of glowing lava; the editor of Cronstedt, indeed, seems the only person hardy enough to suppose, that the zeolite existed in the lava, in its state of fusion.

Mr. Pazumot is of opinion, that zeolite is not a volcanic production, but, as it were, *a re-production, formed by the decomposition of a volcanized earth*; that is, as Mr. St. Fond explains, but without acceding to the opinion, "*Lavas, when decomposed, and acted upon by the aqueous fluid, have given rise to zeolites.*"

But we will scarcely concede, that our extensive basaltic strata (with them currents of lava) after being consolidated in cooling were again all decomposed, merely to admit the formation of zeolite in every part of them; and, when that was done, that these same strata were, by some unknown operation, completely restored to the solid state, in which we always find them.

Mr. Whitehurst admits the formation of zeolites to be posterior to the fusion of the lava (basalt), in which they are enclosed, but "*that they have evidently been exuded through the substance of the lava.*"

This

This Mr. St. Fond will not admit, "as he cannot
"conceive that a water, saturated with stony sub-
"stance, could penetrate the tissue of the most
"compact basalt, to go and deposit the matter
"it holds in dissolution, in some small cavities,
"formed, we know not how, in the centre of a
"compact lava."—*Prin des Volcans.*

Mr. St. Fond himself, a most zealous advocate for the volcanic origin of basalt, too knowing not to perceive the difficulties that zeolite throws in the way of his favourite theory, and too candid not to avow them, is embarrassed, and unhappy on the subject. One time he says, "the lava seized, as it flowed, on the fragments of zeolite it found in its course." Again, finding the crystals and delicate spicula of the zeolite in the centre of compact basalt, which, had it been lava, ought to have fused them, he thinks "the original material of the zeolite was seized, in its natural state, by the lava, as it flowed; that the aqueous fluid, filtered across the basalt, dissolved and crystallized this zeolitic matter."

Not satisfied with this conjecture, he gives it up, and concludes, "I' aimerois mieux croire"—"I would rather believe, that the zeolite itself had been enveloped."

The natural arrangement of our county of Antrim

trim basalts shews at once the futility of Mons. St. Fond's conjectures; for here it is always disposed in parallel strata, accumulated upon one another in many tiers. Now, if all these be (as he supposes) currents of lava, the first, that is, the lowermost, alone, must have seized all the zeolite, or zeolitic matter, while the currents above it, which all flowed over lava only, could not find any to seize; but our zeolites are not limited to any particular basalt strata; the lower, the upper, and the middle strata, abound with them indifferently; also in many, in every situation, no zeolite is found.

M. Dolomieu differs totally from all these gentlemen: he asserts "that zeolite is neither a volcanic dejection, nor a production of fire, nor a matter which the lavas have enveloped when fluid; but that it is the result of a posterior operation, and combination, in which the sea-water has concurred. Lavas, which have not been submerged (he says) never contain it, and, wherever he found lava covered with deposits of water, he was sure to find zeolite."—*Catalogue des produits Volcan. de mont Etna.*

To this conjecture of M. Dolomieu's our county of Antrim basalts and zeolites give the most perverse and positive contradictions; for our columnar

basalt reaches the salt-water in three points only:

The *Giant's Causeway* and *Portmoon* are the two immersions of a vast stratum of columnar basalt, which, having displayed numberless superb colonnades at various heights across the façade of Bengore promontory, buries itself beneath the sea at these points, distant from each other near two miles.

The third spot, where columnar basalt immerses itself beneath the salt-water, is *Currick-a-reale*. Now, notwithstanding Mr. Dolomieu's positive assertion, I have not been able to discover zeolite in the basalt at any of these three places; yet in various other parts of the county, and at every elevation above the sea, it is most abundant; especially on the highest part of *Cave-Hill* mountain, it seems more copious than in any other place.

I fear, this detail of the wild opinions, which have been hazarded by naturalists on the subject of zeolite, and its introduction into basalt, will be tedious to those, who are not proficient in mineralogy; it is proper, however, for their information, to tell them how they may know this fossil; when they meet with it.

Our basalts are frequently very full of small white spots about the size of a pea; these are
zeolite.

zeolite. A sharp eye, or the most common microscope, will discover its crystalline forms and delicate spicula. These spicula, as *M. Haüy* tells us, have singular electric properties, and I know of no other it possesses, save only that, when stirred in the strong acids, it assumes a gelatinous form.

Though zeolite be rarely found in our very finest basalt, the coarser varieties, over the whole county of Antrim, abound with it. Our country rarely affording gravel (being mostly covered by basalt strata) our roads are generally repaired by broken basalt; the workmen too often chuse those, which abound with zeolite, as they are more easily wrought; but gentlemen, who obtain presentments, should guard against this, as pure basalt is more durable than that mixed with zeolite.

The other specimens you send me (the ochres) have been urged as strongly in favour of the existence of volcanoes (at some early period) in the county of Antrim, as the zeolites have been pleaded to prove the contrary. The red strata make a conspicuous figure in the faces of many of our mighty precipices; they are of every thickness, from an inch to above twenty feet, and disposed with great regularity.

Those who have visited volcanic countries, conceiving they have a right to decide upon all questions

tions connected with volcanoes, pronounce our ochres to be *pozzolana* or *tufo*; and it is true, that the ochres of Rathlin are exported to Dublin, to be used as *pozzolana* in the under-water masonry of our canals; but Mr. *Kirwan* proves, that comminuted trapp serves effectually for the same purpose, and I will soon prove that these ochres are nothing but trapp, or basalt, which are admitted to differ from each other only in grain; besides, the steadiness and uniform thickness of our ochreous strata (all disposed in planes) are totally unlike the confused heaps formed by volcanic ejection on surfaces always irregular in the vicinity of burning mountains.

Yet Mr. Mills, without attempting a proof, says, "that the red ochry joints between the beds of rude lava (on the northern coasts of Antrim) give probability to the conjecture, that the whole mass has been the produce of several successive eruptions."—*Phil. Trans.* 1790.

I must observe, that the advocates for the volcanic theory always use the words *basalt* and *lava* as synonymous.

Dr. *Hamilton*, in his Letters upon the county of Antrim, says, "These extensive beds of red ochre, which abound so much among our basalt
" salts

"salts, are supposed to result from an iron earth, reduced to this state of a calx by the long continued and powerful action of heat." And again, page 83, "There is much argil in these calces of iron."

Mr. *Dolomieu* seems of the same opinion, and calls ochres (obviously the same with ours in the county of Antrim) "red clay, which has been half baked."

Mr. *St. Fond*, in an early work, forms them from a different substance; he calls them "basalt baked and calcined by the vapours," (*les fumées*). But in a subsequent work he gives up the agency of fire in the formation of ochres, and in opposition to the opinions of Dr. *Hamilton* and *M. Dolomieu*, he most clearly proves, they never were *argil*, but *lava* (that is basalt) altered, and in his own words afterwards "Basalt decomposed by the action of the sulphureous acid, or some other agent unknown to us."

Mr. *St. Fond* seems at last to have reached the truth, that these ochres are a pure modification of basalt, and that fire was not concerned in the operation.

That the mighty ochreous strata, displayed so magnificently in most of the precipices on the
northern

northern coast of Antrim, were once pure basalt, appears clearly, as I think, from the following facts.

First, we find this ochreous substance in its natural situation, in every intermediate state between sound blue basalt, and ochre red as minium; and we see, that the passage from one extreme to the other is by shades perfectly insensible.

Secondly, we find, that our ochres and basalts contain occasionally the same extraneous matters, to wit, zeolites and calcedonies, and no other, and that the mode, in which these matters are dispersed through both, is precisely the same.

Thirdly, that the natural arrangement of basalt, and the varieties of ochre, is with us the same, that is, extensive strata of uniform thickness, and steady parallelism, mixing and alternating with each other.

The second question to decide is, whether the change from basalt to ochre was made by the action of heat, and I apprehend it was not; for, exclusive of the difficulty in conceiving how heat could be applied uniformly to strata, extending often above a mile, and of every thickness, from an inch to twenty-four feet, the change sometimes commences by veins and ramifications, and

we

we frequently find specimens composed of sound basalt and ochre mixed. Now a violent or uniform heat could not have been applied thus partially; besides, the zeolites, so abundant through our ochres, could not have sustained the heat necessary to effect the change.

It is true, that fire changes the colour of many substances, giving them a reddish tint, and among the rest basalt, as appears in the walls of our kelp-kilns; but the slightest inspection discovers the difference between our ochres and calcined basalt.

Another question arises upon this topic; are the strata, in which we find intermediate stages between basalt and ochre, gradually proceeding to a more ochreous state? Or, has the cause, which produced the change, ceased to act, leaving these strata to continue for ever in the state we now find them?

I apprehend naturalists will find great difficulty in solving these questions, human life being too short for the necessary observations.

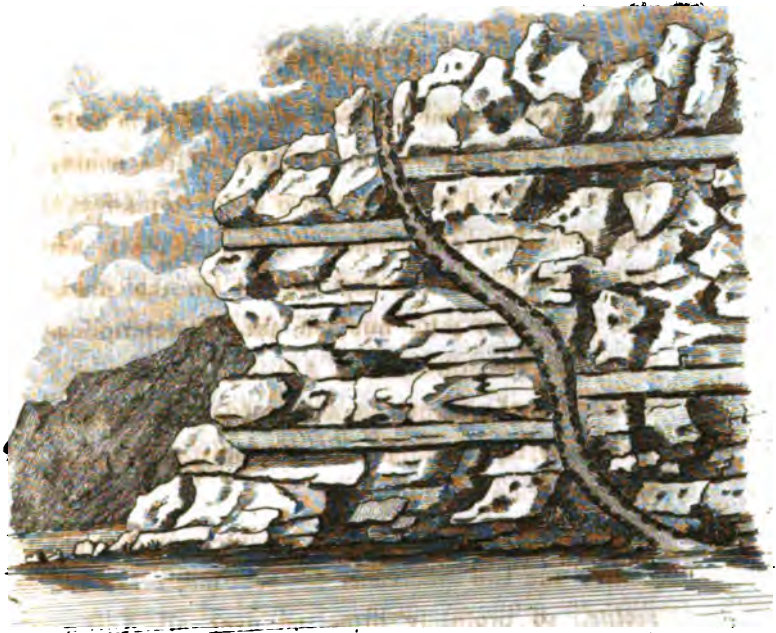
Many of the strata at Cave-hill are in this intermediate state, as appears by their different shades of liver colour, which has occasioned them to be mistaken for porphyry; but I do not recollect any there completely ochreous.

At

At Bengore head, the state of the strata is more decided, nothing but sound basalt, perfect ochre, while, in the façade extending from the Giant's Causeway to Port Rush, and Port Stewart, we find every variety, sound basalt, liver-coloured, and pure ochre; the strata of the last description are in this course very thin.

In general, the strata composed of neat pillars rarely, if ever, become ochreous, or contain zeolite.

No



Tudulating Dyke at Seaport.

No. II.

SECOND LETTER

*To the Rev. J. Dubourdien, on the Basaltic Productions, &c,
of the county of Antrim. By W. Richardson, D. D.*

DEAR SIR,

As you conceive my long residence upon the northern coast of *Antrim*, and my frequent examination of its basaltic productions, enable me to give you such information upon that subject,

as may gratify your readers, and make them better acquainted with the natural wonders of the county, whose statistical survey you are about to publish, I shall cheerfully communicate to you my ideas, and observations, on the topics, and on the places you suggest to me; but a minute description of the whole basaltic coast of Antrim, and a thorough discussion of the questions this fossil has of late given rise to, would far exceed the limits, which you prescribe to yourself.

Having replied to you very minutely on the subject of the two specimens you sent me, *ochre* and *scolite*, so profusely dispersed over all Antrim, you now question me generally on the subject of our more prominent material *basalt*, the characteristic feature of our county, a sort of *differentia essentialis*, distinguishing Antrim from all other parts of Ireland.

For, although some patches of amorphous basalt may be met with in other parts of the kingdom, and though nature has scattered large basaltic districts over many parts of the world, yet it is admitted, that the Antrim prisms and pillars are executed with more neatness than any others.

In magnificence we are said (and particularly by Mr. Pennant) to fail; yet I venture to assert, that such positions are made only by those, who
never

never saw our façades, that excel all others, of which I have read, far more in grandeur than in neatness.

It is mortifying to read the animated description, given by my friend Sir *Joseph Banks*, of the colonnades at *Staffa*, and the humiliating comparison he makes between them and the diminutive productions of human architecture.

I do not wish to derogate from the beauty, nor to depreciate the grandeur of the *Staffa* colonnades; but, as Mr. *Pennant* institutes the comparison, I must tell him that, while the longest pillar at *Staffa* is 55 feet, ours at *Fair-head* are 250. The continuous colonnade at *Fair-head* is longer than the whole island of *Staffa*; and the colonnade at *Bengore* three times as long, and one of its two parallel ranges of pillars equal to the solitary range in *Staffa*.

Though I never saw *Staffa*, I may fairly pronounce our façades to be far more stupendous; for the highest point in the island of *Staffa* is but 126 feet above the level of the sea, while *Pleskin*, scarcely higher than the rest of the façade, is 370, and the uniform columnar range of *Fair-head* 550.

I hope to be excused for this burst of national jealousy, and shall now proceed to your questions.

You

You wish me to define, with precision the bounds of the great *basaltic area*; occupying nine-tenths of *Antrim*, and not limited to *our county*.

You wish to be informed of the mode, in which nature has been pleased to arrange our basalt, with the disposition of the other fossils, and especially the limestone, so important to the agriculture of *Antrim*.

And finally, what changes the surface of *Antrim* seems to have undergone, since the consolidation of the composing materials.

In tracing the boundary of our basaltic area, I must not limit myself entirely to *Antrim*, though comprehending by far the greater portion of it. This fossil occupies, by its strata disposed in steady planes, nearly one third of *Derry*, touches *Down*, and advances, in a long narrow tongue, ten or fifteen miles into the county of *Armagh*.

Basaltic Area.

Commencing from the north-east corner of the county of *Antrim* at *Portrush*, and proceeding eastward so far as *Ballycastle*, the northern ocean forms the boundary, both of *Antrim*, and of the basaltic area.

At the west side of the quay of *Ballycastle*, the line of demarkation between the basaltic country on the

the west, and a district in which the component fossils are much diversified, turns due south, passes about one fourth of a mile to the eastward of *Ardmoy*, and, cutting off the mountains of *Knock-laid*, *Behul*, *Bregah*, *Slieve Aura*, and some more, all resting on schistose bases, turns to the left, deflects to the south-east, and, passing to the northward of the stupendous basaltic hummock of *Lurgaiden*, reaches the eastern sea between *Cushindall* and *Garron-point*.

Here the ocean again, and soon the limestone façades become our boundary for a considerable way; but at what exact point this line quits the shore, and runs parallel to it at a small distance, I cannot now determine with precision, not having lately examined the coast with this object in view.

In the face of the range of hills above *Carrikerfergus* I find the line of demarkation strongly marked by a succession of limestone quarries, extending all the way to *Lisburn*, or, rather, the hills above it.

These are openings in the vast stratum of white limestone, which, in by far the greater part of the basaltic area, forms its boundary, separating the mass of basaltic strata, incumbent on it, from the
more

more diversified materials and more diminutive and irregular arrangements below them, mostly in this line sandstone and indurated clay; while the whole narrow stripe between the shore and the elevated limestone stratum is crossed by numberless *whyn-dykes* passing through the limestone, and burying themselves in the sea.

In the Transactions of the Royal Irish Academy, I have endeavoured, from the rectilineal course of these dykes, to trace them across the channel, and think I have recognised them on different parts of the opposite coast.

From *Lisburn*, our line of boundary turns to the south-west, by *Soldierstown*, and, at *Maira*, enters the county of *Down*, and, crossing a narrow stripe of it, passes by *Magheralin* into *Armagh*.

So far the line is strongly marked, the basalt every where resting on the limestone, where it terminates, never found beyond it.

In *Armagh*, we lose the line of demarkation; but the field stones, and still more the scattered quarries, prove, that a stripe of basalt, about three miles broad, continues all the way to *Market-hill*.

I shewed my friend, the *Earl of Gosford*, in a small façade close to *Gosford Castle*, every characteristic

teristic of the *Giant's Causeway*, the attempt at columnar form, the coarse articulations, and the points ascending from the lower joints, faint and indistinct indeed, but still to be recognized; and our doubts are soon removed by the appearance of our appropriate fossils, on which I have already dwelled so much, *ochre* and *zeolite*.

Returning southwards, the boundary of our area crosses *Lough Neagh* diagonally, catches the *Derry* shore not far from *Ballyronan*; the basalt is found incumbent on white limestone at *Spring-hill*; and, from *Slieve Gallon* to the Northern ocean, the line of demarkation is as strongly pointed out, as on the *Antrim* side, by the limestone quarries shewing themselves like so many white spots on the sides of the hills.

Limestone.

I now proceed, as you desire, to shew the manner, in which nature has been pleased to dispose this fossil (basalt) on our surface, together with its more important attendant, our white limestone, without presuming to enquire by what operations she so arranged them.

The whole county of *Antrim*, exclusive of the eastern stripe I have cut off, and a small district
near

near its center, called the *sandy braes*, is formed by accumulations of basaltic strata, each separately of uniform thickness, and all disposed in steady planes, mostly with a slight inclination to the horizon, ascending at the periphery towards the exterior of the great area.

All these strata shew the distinguishing characters of basalt, the columnar and prismatic form, sometimes neat, again scarcely distinguishable, becoming *per gradus* nearly amorphous.

This accumulation of basaltic strata, (wherever we can ascertain the point) rests on a mighty stratum of white limestone, generally 200 feet thick.

This calcareous stratum, like the mass of basalt strata incumbent on it, everywhere at the periphery dips to the interior;—an unhappy circumstance, as this valuable material is soon immersed too deep to be accessible to man; and we see with much regret, that limestone is to be procured in *Antrim* at the periphery alone; not a single quarry in the interior of the area.

Were this inclination of the limestone stratum attended to, our quarries might be wrought with much less expense than they are at present; when working directly downwards, every huge
nodule

nodule of flint and all other rubble remain still in our way, and encumber us in our operations on the solid stratum.

I had much communication with the late *Earl Macartney* on this subject, and strongly recommended the opening limestone quarries in this stratum, not vertically as at present, but to open an adit in the direction of the plane of the stratum; thus, carts might have access to all parts of the quarry, the façade would be the part attacked, and rubble and flint nodules, once thrown aside, would never again incommode.

I recommended similar measures at the quarries on the western side of our area, where the long ridge of mountain shews a succession of quarries, forming a long dotted line, mostly in the manner of *Freemore*.

I had hoped, from attention to the inclination and rectilineal position of this, or perhaps these vast limestone strata, to have found places, where they so approached the surface as to bring this valuable material in reach.

From the dip of the stratum at the north side of *Cave-hill*, and its consequent submersion, limestone ceases to be accessible; but several miles westward we have a small eruption of white limestone near *Templepatrick*, no doubt, a part of

the same stratum we had lost at *Cave-hill*, but which had been deranged, and elevated, by some operation of nature unknown to us.

Earl O'Neil told me, there is a similar eruption near *Broughshane*, no doubt, part of the great stratum baseting on the eastern face of the mountain above *Glenarm*.

The great stratum of limestone, forming a circular section quite round *Knocklaid*, gives us some curious geological facts, and is very instructive.

The plane of this immense stratum is slightly inclined to the horizon, rising to the north-east, while its lowest point on the mountain is some hundred feet above its base.

Now, if this rectilineal stratum, formed at the bottom of the sea, (as appears from its marine exuviae) once extended far beyond the mountain on all sides, we should find it again in the direction of its dip, where, as it lowers, it should catch the surface far below the height, at which we see it on the side of the mountain.

But, by keeping our eye in the plane of the stratum, and looking to the south-west, we see plainly, that it ought to catch the surface at the distance of two or three miles from the mountain in that direction.

And

And here we actually find it at the quarries of *Ardmoy*, *Balleeny*, and some others, where this material is eagerly sought, so long as it keeps in reach from the surface; but the regular dip to the S. E. soon sinks it too deep.

Before I entirely conclude, I shall avail myself of this valuable fact in other speculations.

Pursuing this train, and hoping, from my acquaintance with the direction of another stratum, that seems parallel to the former, I traced this stratum, that appears near the top of *Croghan* mountain, watched its rectilineal course, until it shewed again at the *Corky* quarries, and I then tried for the appearance of limestone further southward, where I knew it was much wanted.

In the channel of the first brook to the southward, exactly where, from the direction of the strata, I expected to find it, I met with unequivocal indications that limestone was near, such as small particles of limestone with abundance of flints.

The distance from the open quarries of *Corky* was so small (perhaps half a mile) as not to make it worth while to break new ground, especially below the surface; should the property change in that distance, the discovery may be convenient.

Proceeding

Proceeding still farther southward, I sought carefully for indications, but could find none; and while the mountains, all suddenly abrupted on their eastern face, shewed clearly the nature and disposition of the strata, their milder declivities on their western side shewed no break to serve as a clue to direct me.

To bore at random, without indications, through accumulated strata of *basalt* would have been folly; and even the small brooks came down with so little rapidity, that I could not find ravines cut deep enough to disclose what was beneath.

On the skirt of the mountain *Dixie* I was more fortunate, and, as the dorsum of the ridge running northwards from that mountain was narrow and tolerably sharp, I conceived that the great calcareous stratum baseting on the east side, and dipping to the west, might in its rectilineal course approach so near to the surface as to be accessible for use.

I accordingly sought carefully for indications, and in a deep channel found flints, and small white calcareous pebbles (infallible proofs that the great limestone stratum was near) a considerable way down the hill on its west side, and about a mile from the quarries on its eastern face.

Should

Should a limestone quarry be found here, (as I have little doubt it will) the convenience to the parish of *Killead*, at least, will be very great; a mile will be shortened, and the ascent of the mountain will be saved.

Should, upon trial, the great stratum be found in the place I point out, it will be prudent to attack it from a point much lower, by a horizontal adit, for the same reasons I have assigned above.

Should we be so fortunate here as to hit upon the stratum, we may look with more confidence to the southward on the same side, and diligently explore the little ravines towards the sources of the brooks, which form the *Crumlin* and *Glenavy* rivers.

The discovery would abate in its importance, as we advance to the southward; because we approach the actual baset of the stratum at *Soldierstown*.

Still, however, abundance of lime in a country, whose soil is either peaty, or basaltic clay, (each more highly meliorated by lime than any other description) must be a very serious advantage.

Coal.

That the discovery of *coal* strata in parts of *Antrim*, where this valuable fossil has not yet been found

found, would be of extreme importance, cannot be doubted.

Strata of *coal*, graduating into *bituminous schistus*, are abundant in the district I have cut off, by a line drawn from the quay of *Ballycastle* by *Ardmoy* to *Cushindall*; but the materials, of which that district are formed, are very different from those of the great basaltic area.

Basalt columnar, and prismatic, no doubt abounds in both; but in that smaller eastern district *schistus* is predominant, *freestone* strata frequent, and, at *Cushindun*, *pudding stone* in abundance.

I never met with any of these fossils in the great basaltic area. The limestone at its periphery, where alone it is found, is invariably *white*, while I hear there are quarries of *blue* limestone in the lesser district; and I was with my friend, the celebrated Dr. *Davy*, when he found *blue* limestone under the west façade of Fair-head.

Hence, from the great difference in the materials of which these two districts are constructed, and the more irregular manner in which these component parts are arranged in the smaller, we cannot reason from analogy, nor infer that the presence of any one fossil in the *lesser* district

trict gives us any reason to expect, that it will also be found in the *greater*, that is, in the rest of the county.

The existence of *coal* then becomes a pure question of *fact*. Has nature actually interposed strata of coal between the basalt strata, of which our country is almost exclusively formed?

With but one material, we have no indications to guide us; in the eastern district, on both sides *Fair-head*, strata of *freestone* and *coal* alternate to a considerable accumulation; but freestone (so strong a symptom of the proximity of coal) is not found in any part of the great area, with which I am acquainted. Our accumulated strata are all pure *basalt*, and it would be a bold measure to bore at random through such a mass, without any hint from nature, that there was a probability of attaining our object.

Though not a common situation for *coal*, we certainly have two instances, at least, of a stratum of coal between pure basaltic strata, which I have examined.

One at *Mount Druid*, near *Ballintoy*, where the coal is of that curious description, found also at *Borey*, and sometimes called *Herturbrand*; the grain, the fibrous and lamellar construction, are such as to leave scarcely a doubt, that this *coal*
was

was oncè actual wood; while, on the other hand, the flat stratum, in which it is disposed, baffles conjecture to devise a mode, an operation of nature, by which a *forest* could be converted into a flat thin stratum, without a trace of the tree *form* remaining, *branch, stem, or root.*

This subject may be interesting to the *cosmogonist*, but with us it is unimportant, as the stratum seems too thin to promise any serious benefit.

I saw nothing encouraging in the coal stratum, which comes to the surface in *Killymorris*, like the other, compressed between basalt strata.

The mine had not been recently touched, nor was it easy to form a judgment of the *quality* of the material, and in *quantity* it seemed scanty; even had appearances been more favourable, there was little encouragement to proceed; the stratum opened in the centre of the county, remote from any seaport, or inland navigation, open, or in prospect, or even possibility; while the profusion of peat moss, scattered every where about, secured abundance of fuel to the inhabitants of the vicinity for centuries to come.

Upon the whole, I fear, the main body of the county of Antrim, that is, the basaltic area, holds out small encouragement to the miner; his field
seems

seems limited to the north-eastern district, where there is a greater variety of materials, and more diversity in their arrangement; and, in fact, the mountain *Slieve Aura* has been long supposed (I know not upon what authority) to contain mines.

The narrow eastern stripe, comprized between the opening of the great limestone stratum and the boundary of the county, (that is, the sea and the *Lagan*) does not hold out so forbidding an aspect; and, to the westward of Belfast, it shews a new material, a stratum of *gypsum*.

In one spot more of the county some operation of nature has, in an area near four miles in diameter, carried off the basaltic accumulation, and laid bare the *substratum* formed of an extraordinary substance, which has puzzled mineralogists to find a name for.

A *breccia*, generally reddish; the minute angular particles, *separately* of extreme hardness, but *united* to each other with very different degrees of cohesion, sometimes firm solid rock, sometimes quite friable.

In this last state, it affords the finest material for making roads I ever met with; the mass most accessible, and separable, while the minute component parts (among which opal is often met with) are of extreme hardness.

The aptitude of this material for gravelling roads is so well known, that the proximity of this district is always announced by the reddish stuff forming the road, in whatever direction you approach the Sandy Braes.

The district is called the *Sandy Braes*, and lies between *Templepatrick* and *Kells*. In this area, the appearance of a material quite new to us, underlying the basalt, may be followed by a *new* substratum; a point worth inquiring into. On the western side of the area, from *Slieve Gullion* to *Carnlogher*, where similar operations have partly removed the basaltic covering, the substratum is *schistose*.

The freestone strata on the north-west face of the mountain *Bohul Bregagh*, above *Ardmoy*, afford some indications of *coal*; the distance from the sea not being great, and all down hill, the experiment may be worth trying.

Form of our surface, and loss of its materials.

Your next question; *What alterations has the surface of the county of Antrim undergone, since the consolidation of the strata of which it is formed?* leads to a wild train of speculation, that may be

be deemed to pass the limit, to which a statistical survey should extend.

But, be it remembered, *Antrim* is your subject, and if it has pleased nature to lay bare her arrangements, and disclose her secrets in the county of *Antrim*, in a more complete manner than she has vouchsafed to do in any other country, which I have seen or read of, are we not to avail ourselves of her kindness, and, as she withdraws her veil, to try what conclusions follow from the facts, and scenes, she lays open to us?

As we travel through the rest of *Ireland*, we can barely tell the solitary material under us; the arrangement of these materials is only to be discovered by laborious investigation; but, as we advance in *Antrim*, the scene opens; inspection seems to supply the place of exploitation; and, as we approach her northern shore, we recognize with wonder the features and arrangements of nature opening upon us, like the Roman lady getting rid of her cosmetics.

*Tandem aperit vultum, et tectoria primo reponit,
Incipit agnoscere —*

We now discover, that our whole county is formed by the accumulation of the strata I have mentioned; all rectilineal planes, all preserving nearly

nearly the same thickness in their whole extent, save the upper stratum.

We can tell also, in reference to your question, that these strata are not *now* exactly in the positions, in which they were formed; they must have been originally horizontal; for, both the calcareous and basaltic materials bear undeniable marks of having been once in a state of fluidity.

The *pectinites*, *belemnites*, and *echinites*, in the limestone strata, prove that they were formed at the bottom of the sea; we pronounce the same judgment on the fine basalt at *Portrush*, from the profusion of impressions of *cornua ammonis* scattered through their strata; and, though the columnar and prismatic basalt over the face of the county do not bear such unequivocal marks of their former fluid state, yet these regular forms, and the uniform thinness of their strata, could only have been acquired from a state of fluidity, which necessarily induces horizontal positions.

The first operation then, that our globe sustained, seems to have been a slight derangement of our strata from their horizontal positions, as we now find our basaltic strata generally inclined in an angle of about seven degrees, while the angle, which our calcareous strata form with the horizon, is commonly greater by two degrees.

I can

I can form no idea on the nature of these operations ; for they must have been numerous and diversified, the inclinations of the strata varying somewhat, and the direction of the dip changing.

It is plain, from these diminutive deviations from original position, that the operation, which caused them, was totally different from those so confidently maintained by the disciples of Dr. *Hutton*, who taught that the strata of the world, formed at the bottom of the sea, were by tremendous explosions (kindled in their watery bed) blown up to the tops of our highest mountains, shivered and shattered, contorted and bent.

When, in reply to these vain whimsies, I shewed from the state and positions of the strata of *Antrim*, that such operation had never been performed upon them, a sort of composition was proposed to me ; I was told that, if I would suffer the *Huttonians* to blow up the rest of the world as they pleased, *Antrim* should be left out of the controversy, and its strata should remain undisturbed.

I declined the terms, finding the strata of the world, wherever carefully examined, arranged pretty much in the same way with those of *Antrim*, where the component materials were the same. I particularly refer to *Townsend's Travels in Spain*, in
which

which that intelligent gentleman gives us the positions of the strata of that great country with minute exactness.

I shall now extend my reply to your questions, and proceed to changes of a much more extraordinary nature, which the surface of the county of *Antrim* has sustained.

I am aware I shall risk a second impeachment of my sanity, having already been pronounced *mad* for detailing the wonderful properties of our *Antrim* grass; for it was at *Portrush* I first noticed *forin stolones*.

I shall at least be charged with hazarding a wilder theory of *my own* than any of those I have so often combated, and with supporting opinions more extravagant than those I have ventured to ridicule.

I reply, that I have no favourite theory, nor do I entertain *opinions* on geological subjects; I deal in *facts* alone, and the conclusions, that (I think) necessarily follow from them.

Let my facts be denied; let the conclusions I draw from them be impeached, if they do not follow. But, if the *facts* I state be prominent, obtruding themselves irresistibly upon those, who attend to such things, and, if the positions I lay down be the *necessary results* of these uncontroverted *facts*,

I hope

I hope my *conclusions* will not be rejected for their magnitude alone, nor former operations of nature be denied, because we are unable to discover the agents that were employed, or the modes in which they were executed.

The inequality of surface, which contributes so much to the beauty of the world, and which is attended by so many conveniencies, has puzzled naturalists to account for.

Our *hills* and *mountains*, some say, were formed by subterraneous swellings, raising them up to their present height.

Ovid introduces *Pythagoras* giving a beautiful account of the mode, in which these operations were executed.*

Dr. Hutton

* ——— “ Quondam planissima campi
Area, nunc tumulus; nam, res horrenda relatu,
Vis fera ventorum cœcis inclita cavernis
Explorare aliqui capitis lactatæque frustra
Ubiore frui caelo, cum carcere rima
Nulla foret toto, nec pervia flatibus esset;
Extentam tumefecit humum ceu spiritus oris
Tendere vesicam solet aut direpta bicorni
Terga capro. Tathor ille loci permanat, et ævi
Collis habet speciem, longæque iaderunt ævo.

OVID MET. L. 15.

Dt. *Hutton* accounts for the formation of mountains by subterraneous explosions blowing up the horizontal strata, at the bottom of the sea, into the irregular elevations we now find; while, with his illustrator, Mr. *Playfair*, he makes our vallies merely cut out by our rivers in the course of ages.

That these were not the agents, which diversified the surface of *Antrim*, will not be very difficult to shew.

Were we to speculate *a priori* on the form of the surface *Antrim* should have, we would say, that at first it must have been a uniform plain, from the horizontal planes of the strata, of which we see it is formed.

After these had been somewhat displaced, as I have stated, the new figure of the *Antrim* surface must have been a succession of smaller plains slightly inclined to the horizon.

Nothing can be more unlike our *present* surface, bold mountains, mild swelling hills, and frequent vallies, mostly defined by varying curves, such as never could have been produced by any accumulation of rectilineal strata.

When the naturalist, anxious to account for this anomalous appearance, examines with attention, he finds the arrangements of the component strata have not the slightest influence on the form of our surface;

surface ; that its figure is governed by their *removals*, not their positions ; that the materials which once formed it, have been carried off irregularly, and, for aught we can see, capriciously ; hence the form of the surface *left* must be irregular and diversified, and such we find it.

To illustrate this, I compare the area of *Antrim*, in its early state, to a vast tablet or block of stratified marble, upon which a mighty operator has been set at work to form in bass-relief our present surface.

According to this idea, our prominences, of whatever size, are undisturbed parts of the original *block*, while the materials, that once filled the hollows and cavities, have all vanished (as in our diminutive bass-reliefs) under the hand of the operator.

Our mountains, in this point of view, are no longer to be considered as the stupendous fabrics of a mighty agent ; we must look upon *Knocklaid*, *Stemish*, *Divis*, &c. merely as the scattered remnants of a diminished world, whose uniform substance once reached beyond their summits, and we know not how far.

Let us now see what are the *facts*, by which these wild positions are upheld ; what are the appearances,

appearance, from which we infer the surface of *Austrim* to have sustained such tremendous operations.

Had the county once been a vast stratified mass, like the block of marble, to which I compared it, then deeply engraved upon; wherever excavations are formed, and prominences left remaining, in both cases the rectilinear strata, of which they are both formed, must show the edges of their planes on the sides of every elevation, and point out the abruptness, where the plane of the stratum, once continued further, was taken away from what remains, and carried off.

Could a more accurate description be given of the present face of the county of *Austrim*, almost every hill and mountain shows upon its sides the strata, of which it is composed, bassetting, that is, coming to the surface, in the rectilinear direction of their planes, where they reach the surface on their sides.

Nature, kindly disclosing her construction of *Austrim*, often shews these facts of herself in numberless instances, and where the removal of the materials has been abrupt, so as to leave a precipice, which occurs often, the whole arrangement is laid bare, as on the perpendicular sides of the marble block

block I compare it to; for what are the mighty
facades lining our northern coast, but the sides of
the *Antrim* block?

Even where a grassy covering conceals the ar-
rangement beneath, we are sure to find the strata
in their recumbent course, wherever we have oc-
casion to look for them.

The abruption and removal of the *Antrim* strata
is not disclosed on the sides of our hills alone; the
summits or dorsa of our long ridges have often
the abruptions of our strata curiously marked upon
them, like so many steps of stairs; see the profile
of the ridge of *Croughmore*, taken at four or five
miles distance from the west.

Our mountains and hills, I have said, were not
formed, but *left behind*; not constructed in the
places where we find them, but the irregular rem-
nants of a mighty block, the parts of which once
contiguous to them have been completely carried
away.

Let us examine some of our *Antrim* mountains.

Will it be said that *Knocklaid*, composed of three
great strata, a *schistose*, a *calcareous*, and a *basal-
tic*, was constructed of these materials, and shaped
into the segment of a sphere, as it now stands
solitary?

Be

Be it remembered, that the middle stratum (the calcareous) bears undeniable marks of having been formed at the bottom of the sea.

This stratum by its rectilineal plane (as if in the hands of a mathematician cutting off a spherical segment) marks its section with the surface on the whole contour of the mountain; irresistible proof, that it was once continued farther in every direction, even if we had not found it again at *Ardmoy*, and its vicinity, the only points, in which, from the inclination of this plane, it could catch our present surface.

What is *Slennish*? a round hammock, formed by an accumulation of rectilineal basaltic strata, of steady parallelism. (see the view.)

Was this mountain, so conspicuous over all *Antrim*, formed by heaping circular portions of basaltic strata upon each other, until it attained its present stupendous height?—an operation similar to that of old, in which the giants failed.

“Ter sunt conatæ imponere Pelion Ossam,

“Scilicet atque Ossa frondosum involvere Olympum.

Or, shall we suppose that this mountain, composed of the very same materials with the rest of *Antrim*, and arranged in precisely the same man-

ner,

ner, was once included in the vast block, and left in its present form by the removal of the contiguous materials?

The mountain *Lurgaidon*, in the *Glynnes*, is more beautiful, as a bold perpendicular façade, surrounding its flat summit, shews the nature and arrangement of its strata more distinctly.

Descending from our mountains, I come to the singular hummock of *Dunmull*, also surrounded by a perpendicular façade, disclosing the two strata, of which it is formed, a columnar and an irregular prismatic, the two varieties of basalt, of which in alternate strata the long ridge on the top of which *Dunmull* stands, the parallel ridge terminating at *Pleskin*, and the whole intermediate country was formed.

We apply the same reasoning to shew, that *Lurgaidon* and *Dunmull* are not solitary erections, but were once parts of the vast mass, in materials and arrangement precisely the same with themselves.

Similar hummocks, generally in elevated situations, and always stratified, are scattered over the whole surface of *Antrim*; yet this regular stratification on the summits of hills is so incompatible with received theories, that its existence has been denied.

For,

For, says the historian of the Academy of Sciences for the year 1746, "such stratified mounts must have been elevated in the direction of an axis, perpendicular to the horizon, a thing nearly impossible."

When I compared the operations, performed on the surface of *Antrim*, to the engravings on a marble tablet, I said, pursuing the parallel, that the materials, which once filled the cavities, had in both cases vanished under the hand of the operator.

Let us establish this curious fact.

Assuming, that the limestone stratum, forming a circular section round *Knocklaid*, was once continuous so far as *Ardmoy*, and *Balleany*, what has become of such a mass of materials, not a particle of limestone rubble to be met with in the interval between *Knocklaid* and *Ardmoy*, the two points, where the stratum is resumed after having lost its intermediate part.

In like manner a similar stratum, bassetting far up on the north-eastern face of *Cave-hill* (above the villa called the Throne) and lost in the valley between *Cave-hill* and the hill of *Cormency*, is resumed on the south-eastern face of the latter hill a little lower, but in the direct course of its rectilinear plane.

Who, that traces the steady course of this undisturbed stratum, for many miles on the face of the hills

hills north and south, can doubt that it was once quite continuous, that its façades and quarries on the two hills were once connected, and that the valley, by which we now pass from *Belfast to Templepatrick*, is of posterior formation, excavated many hundred feet deep through the continuous basaltic and calcareous strata, and the more irregular materials, upon which they rested?

In this case the stratum, before it was disturbed, continuing from hill to hill, stretched like a roof over the interjacent country and the road, by which we now travel.

Are there any remnants of this vast mass left? any calcareous rubble scattered over the valley?—not a particle; the small broken white limestones extend but a few yards from the foot of the façade, or quarries; the rest of the materials have all vanished.

The case is the same in every valley through *Antrim*, whether it be wide, and the disrupted parts of the strata remote from each other; or whether, as in our northern façades, it be a mere chasm, with the edges of the opposite strata so near, as upon inspection to proclaim their former union.

Where there is no valley, but merely a perpendicular precipice, such as lines two thirds of the coast

coast of *Antrim*, from *Portrush* to *Ballycastle*, the materials of the strata, which obviously once projected farther north, are all carried off; and I boldly say that, after repeated examination of that whole line of coast, I never met with the debris of an upper stratum, except close to the Giant's Causeway, on each side of which some large spherical masses are found; obviously belonging to the stratum, which immediately rests on the neat columnar one, of a projecting part of which the causeway is formed, the materials once incumbent on it having been carried off.

I shall here probably be told, that the ruins lying in many places at the foot of the precipice, called by Mr. *Whitchurst* "*an awful wreck of the terraqueous globe*," are the remnants of what fell from the precipice above; and the wild fragments scattered at the foot of the façade, when its profile is viewed from the east side of *Pleskin*, will probably be quoted on me.

I well know the capricious irregularity exhibited in such terrific grandeur, and have carefully examined every rude prominence, composing the dreadful scene, and find them *all*, of whatever form, to be undisturbed parts of the original block, stratified like it, with the strata in both of
similar

similar inclination, and the disrupted parts pointing towards each other.

I am aware I have pressed this point with tedious minuteness, but the paradoxical position I am supporting, to wit, that the present surface of *Antrim* is much lower than it was at a former period, turns entirely on the disruption of its strata, and the complete removal of the materials.

I shall add but one fact more, which bears upon both points. The hills or mountains surrounding the district, called the *Sandy Braes*, are all stratified basalt, their form, that of all other basalt hills, sloping gradually at one side, and more suddenly abrupted at the other; while, in the lower area, the basalt has vanished, a sort of reddish porphyry alone is to be met with, and the numerous little hills, scattered over the district, are, every one without exception, correct segments of spheres.

The form of our surface, and the shapes of our hills, depend more than we are aware of on the material composing them, a change of materials generally producing hills of a different figure; a subject of much curiosity, but not adapted to a statistical survey.

I have said, that the materials have been carried off, not only from our hollows and vallies, but even

G

from

from the tops of our hills and mountains, many of which bear irresistible marks of having been once higher than they are at present.

I could produce many proofs from other countries, and even from our own neighbouring mountains of *Down* and *Derry*; but I am limited to *Antrim*, and not at a loss.

The mountain *Croghan*, some miles south from *Knocklaid*, is cut across near its summit by the plane of a great limestone stratum, leaving above it a lump or hummock of basalt.

This could not have been *original formation*, nor the effect of convulsion, as the white limestone stratum continues its rectilineal course all the way to *Corkey*.

Croghan must, like the other mountains on the east of *Antrim*, have had an accumulation of basaltic strata, resting on the limestone, and of which accumulation the hummock I mention is all that remains.

M^r Arts Castle, on the top of the façade at *Cavehill*, is the last remnant of a stratum, that once, no doubt, extended like those it rests upon, but which has been all carried off, except the pittance I mention.

The gigantic pillars at *Fair-head*, whose summits rise 550 feet above the level of the sea immediately

ately below, shew plainly, that the present irregular line of surface is not the original termination of the colonnade, but that it must once have reached much higher.

While the façade at *Bengore*, now composed of *ten* strata, and three hundred and seventy feet high, once consisted of *sixteen*, for we can trace *six* more from their emersion, until in their approach to the façade they are cut short before they reach it; whereas, had they been suffered, like those below them, to reach the façade, as they once did, they would have added one hundred and fifty feet to its height.

This curious topic, the diminution of our surface, with the total loss of the materials that composed it, I have discussed more generally in a letter to my friend Dr. *Davy* (then secretary to the Royal Society) published in the *Philosophical Transactions* for the year 1808, vol. 98.

Some months afterwards, a scientific friend, transmitted me a paper, written by a Mr. *Farey*, and published in a philosophical magazine.

Mr. *Farey* comments on my memoir in a very flattering manner, and exults in finding, that a gentleman, who had not met with his essay on the same subject, had, from facts in another country, drawn conclusions similar to those he
himself

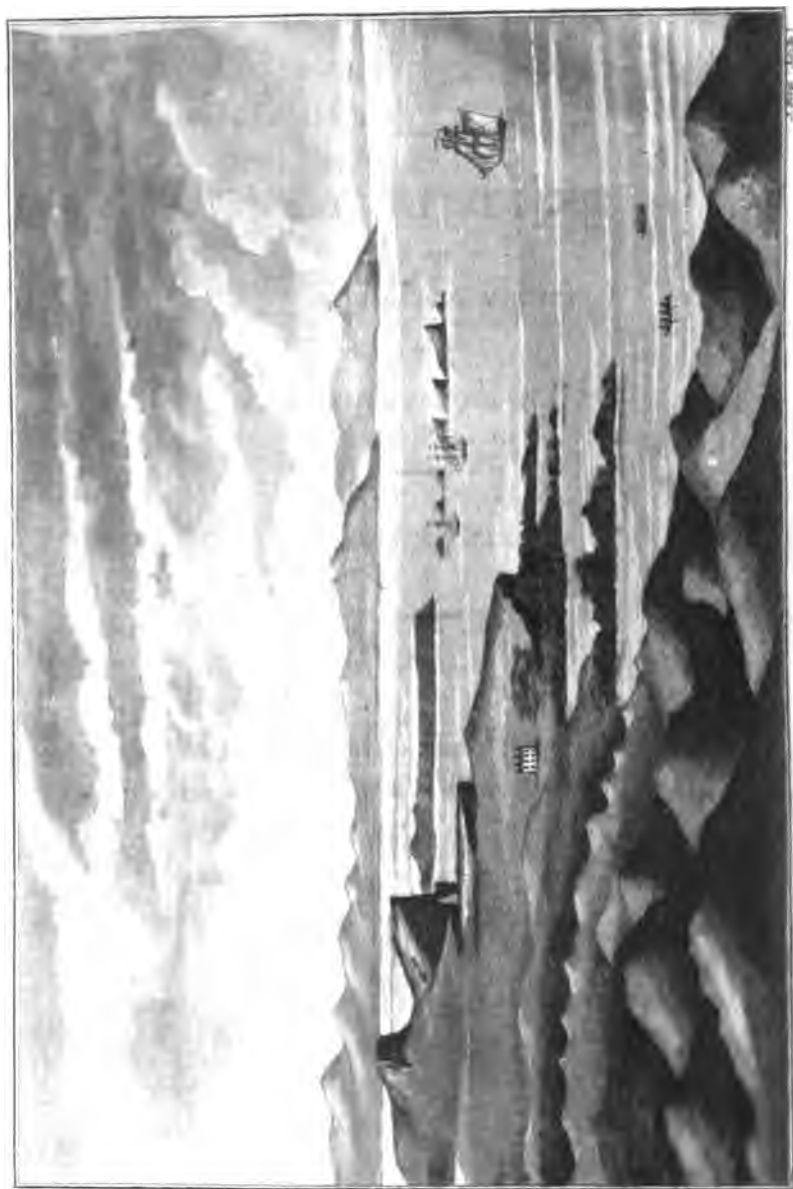
himself had deduced from the arrangements, positions, and abruptions of the strata in different parts of *England*.

My friend, indeed, considered me as more prudent than Mr. Farey; for, while I do not presume even to conjecture as to the agents, by which these mighty operations have been executed, contenting myself with establishing the *facts*, Mr. *Farey* goes further, and supposes, that one of the diminutive and newly-discovered planets has, in some of its revolutions come so near to our globe, as to have changed the direction of gravitation, and, in its rapid progress close to our surface, to have carried off the materials we now miss.

W. RICHARDSON.

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View from the Road near the GIANTS CAUSEWAY.

Disappearing on the left is the Causeway, along the Northern shore, surrounded by the sea, the mountains and the hills.

No. III.

THIRD LETTER

TO

THE REV. J. DUBOURDIEU,

FROM

WILLIAM RICHARDSON, D. D.

ITINERARY.

DEAR SIR,

YOU inform me, that strangers coming to see the Giant's Causeway, and the other natural wonders, which the county of Antrim exhibits in such profusion, are often at a loss where to find many of them, and you think the statistical survey of the county should point out what the most prominent curiosities of the country are, and by what roads strangers can best get access to them.

You therefore request from me a sort of *Itinerary*, stating what are the roads I advise the curious stranger to pursue, by which the objects worthy of his
attention

attention may be best approached, and that I will enumerate those I recommend to his notice.

In complying with your request, I shall limit myself to such objects as are peculiar to *Antrim*, and not to be met with in any other county of Ireland; these I consider as of four separate descriptions.

1st. *Basalt*, arranged in beautiful colonnades, the pillars formed of prismatic joints, executed with extreme neatness.

2d. *Whyn-dykes*, those stupendous walls, which, issuing from the interior of *Antrim*, and diverging in all directions, are first discovered on the coast, where they cut through the precipices, lining it, and bury themselves in the sea, without any great intermissions, for a length of near sixty Irish miles.

3d. *Basaltic hummocks*, generally stratified, scattered over the whole face of *Antrim*, and of all magnitudes, from the gigantic mountain down to the most diminutive hillock.

4th. The arrangement and alternations of our strata, so happily disclosed in *Antrim*, as to enable us to penetrate farther into the secrets of nature, than she has suffered to be done in any other country.

You complain, that strangers have not precise directions; *I complain* of the absurdity of many of these strangers, who, coming from great distances to

see

see curious operations of nature, so limit themselves in time as to be able to examine but few of them, and, when told of others, perhaps still more curious, they lament, that their arrangements are made and they must return.

The *Itinerary* you call for will put an end to these complaints; the stranger will have his objects pointed out to him, and, from their number and variety, will see the necessity of allowing himself time to satisfy his curiosity; and, as he has always in his power to *shorten* his tour, he will be wrong to put it out of his power to *lengthen* it, should the remaining objects promise him further gratification.

Commencing his tour, there are two points or stations, between which he must chuse, *Coleraine* and *Bushmills*, and he will probably be influenced in his choice by the state of accommodation to be afforded at the time of his visit,

Bushmills, cæteris paribus, is decidedly preferable, on account of its vicinity to the most important object; and several strangers have of late given me good report of their accommodation at *Gamble's New inn*, where they tell me they found much room, and more comfort than they expected.

It is of little consequence from which of these points the stranger sets out. The circle comprehending

hending the curious objects, contained between the *Bush* and the *Bann*, remains the same, no matter where it is first encountered, I shall suppose from Coleraine.

Proceeding due east for a mile and a half, the stranger is to turn to the left, at nearly a right angle, by the road to *Ballylagan*; here, close to the road, just opposite to the little villa, once occupied, and still owned by my friend *Hugh Lyle, Esq.* is the quarry, or opening of the stratum, where many of the cavities, of which the basalt there is full, still contain fresh water, as no doubt they all once did.

This curious fact, which I have shewn to many, has been positively denied, as totally subversive of the theory, which supposes all basalt to have been once *fluid lava*.

Of this point every one may satisfy themselves, and with the more ease if the quarry happens to be wrought at the time.

Proceeding due north to *Ballywillan* church, the bold ridge of hill on the right hand displays, the whole way, the columnar and prismatic edges of the parallel strata, by the accumulation of which it is formed.

Turning due east from the church, in half a mile we arrive at the beautiful façade of *Craigahuller*,

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ASTOR LENOX AND
TILDEN FOUNDATIONS.



View of Craighullar.

two hundred yards from the road, on the right hand.

This colonnade is formed of the neatest pillars we have, except those of the Giant's Causeway itself, and scarcely inferior to them.

It is composed of two strata, the lower columnar, the upper of that variety of basalt I have called *irregular prismatic*.

As much of the northern coast and country is formed by accumulations of these two varieties of basalt, alternating with each other in parallel strata. I select this most accessible spot, to call the attention of the stranger to a few geological facts always attending these strata, wherever met with *together*, and more easily ascertained *here* than in any other place.

The grain of the basalt in each stratum is precisely the same, the principle of their construction totally different; the columnar formed into large articulated pillars, always nearly vertical; the other into prisms much smaller, not articulated, and with their axes indifferent to all positions, and perpetually changing them, as at *Craigahuller*, on the west side, they incline in a great angle to the west, and on the east side to the east; nor are they always even rectilineal, but frequently undulate in wavy curves.

Notwithstanding these important differences, these strata *here*, and every where else, pass into each other *per saltum*, and never *per gradus*, leaving the line of demarcation between them (at least when viewed from some little distance) tolerably correct; and, in the transit from one stratum to the other, the solidity or continuity of the material is never interrupted, as appears by cracks passing direct from one stratum far into the other.

Another curious fact is not to be passed over, that these strata are perfectly solid, *separable* into pillars and prisms, but actually *separated* only by posterior operation; chiefly, I believe, from the contraction and dilatation occasioned by different degrees of heat and cold.

The *irregular prismatic* indeed generally remains solid, and that the columnar was originally so appears from two strong facts.

The hollows on the surface of the Giant's Causeway hold water without leaking; and the pillars at Fairhead are so solidly united as not to be separated by a fall of 200 feet.

I shall be charged with having dwelled quite too long on this façade of *Craigahuller*; but this alternation of strata so compleatly displayed there, and so frequent in the northern part of *Antrim*, is a
common

common basaltic arrangement over the world, though never noticed before, and a fact which, when carefully considered, is of itself subversive of every separate theory upon original formation.

In the Transactions of the *Royal Irish Academy* I have traced this arrangement in most basaltic countries; in *France*, in *Sicily*, in the north of *Italy*, at *Ardtun* in the *isle of Mull*; and every person, who has visited *Staffa*, instantly recognizes the exact similitude between what they call the *Roof*, covering the range of pillars at *Staffa*, and the irregular prismatic stratum spread over the colonnade at *Craigahuller*.

Proceeding eastward, the castle of *Dunluce*, curious from its situation, has few attractions for the naturalist.

From the whole road to *Ballintray*, we see the construction of the hills on our right laid before us by the frequent baseting of the prismatic and columnar strata, alternating as at *Craigahuller*, not indeed quite so well laid open, never having been quarried into.

From the hill above *Ballintray* we see, at about five miles distance, the ridge of *Croaghmore*, of whose outline I give a sketch.

Immediately below the bridge of *Bushmills*, the arrangement of the strata, of which our country is
most

most happily laid open to inspection with little trouble.

The piers of the bridge rest upon the polygonal heads of a columnar stratum, while the river *Bush* passes down through an opening in the two strata ; by going 50 yards down the western bank of the *Bush*, we are close to a façade, composed of two strata like *Craigahuller*, but not so neat ; the small pillars of the irregular prismatic are at the north end of the range, vertical as at *Dunmull* ; the complete solidity of the whole mass ascertained by cracks, the great pillars of the lower stratum passing into the smaller perpendicular prisms of the upper, as an uplifted hand separates into fingers.

As I am describing a circle, I now turn back west to *Coleraine* by the great road, near which the only important objects I know are two basaltic hummocks.

The first on the south side, near *Beardville*, elevated above the plain ; it attracted my attention, when riding with my friend, Mr. M'Naghten, our knight of the shire, upon whose estate it lay.

Mr. M'Naghten told me it was a *Danish fort* ; I thought it a basaltic hummock ; we agreed to go and see which, and were much amazed at finding we were both right.

The

The little circular façade had been lowered somehow on the western side; the damage had been repaired by laying two rows of the great prisms, with their axes horizontal, in the breach.

The round form of the *Danish fort*, or (what is more likely) the *Druidical monument*, being somewhat restored, the new work was easily distinguished from the original façade, the axes of the prisms in the former case being horizontal, in the latter vertical.

The hummock of *Dunmull* lies half a mile more to the west, and about a quarter north from the road.

Dunmull (mistaken by Dr. Hamilton for an old fort) I consider as an object of much greater curiosity than the *Giant's Causeway* itself, columnar and prismatic also, though its gigantic prisms are deficient in neatness; yet this basaltic character is sufficiently impressed on them. But in a geological point of view *Dunmull* opens a wide field for speculation, when on its towering summit we look around for the rest of the strata, on whose last remnant we stand.

Proceeding about a mile west, we arrive at the point we set out from, having completed our circle.

Portrush is equidistant from *Coleraine* and *Bushmills*, five miles from each. This delightful little peninsula

peninsula abounds with *facts* highly interesting to the naturalist, and so applicable to the questions now agitated by geologists, that, just before I was led away by another object, I had promised a memoir, in which I undertook to shew the insufficiency of each of the three modern theories, the *Volcanic*, the *Huttonian*, and the *Neptunian*, separately, from the facts exhibited in that small peninsula.

*Humani generis mores tibi nosse volenti
Sufficit una domus.*

I shall state a few of these questions, to tempt the curious tourist not to neglect this rich spot, so near to him, and so accessible in every point.

The *aqueous* origin of the fine-grained basalt is established by the profusion of marine exuvæ, especially *ceratua ammonis*, found all through it.

The probability that the same origin may be ascribed to the coarser basalt, from their similar arrangement, and still more from their passing into each other without interrupting the solidity and continuity of the material.

The frequent changes nature makes in the stile of her construction, varying her materials and their arrangement every hundred yards, at the same time

time preserving a uniform inclination through the strata so diversified; whence it is plain no convulsion took place on this peninsula.

The strong contrast between the principles, on which the opposite sides of the peninsula are constructed.

The *western*, a magnificent range of rude massive columns, 80 feet high, to the exclusion of strata.

The *eastern*, an accumulation of diminutive strata, to the exclusion of pillars.

The *white rocks*, a mile east of *Portrush*, are well worth examining.

A beautiful calcareous façade, half a mile long, capriciously hollowed into a vast number of magnificent caves, all differing from each other.

Here we are disposed to ask by what operation of nature were so many, and such grand excavations made?

I can only answer negatively, *not* (as often supposed) by the breach of the waves, however violent here; for we must ascribe similar effects to the same cause; now, though the majority of our caves be near the level of the ocean, *Antrim* shews similar caves much above the reach of the sea, as at *Cushindun*, and, several hundred feet above it, at *Cavehill*.

At

At these rocks, and every where along our coast, the naturalist may satisfy himself, that neither our basaltic, nor our calcareous rocks, are worn, or even have the slightest impression made upon them by the most violent and continued breach of the sea; our rocks are only acted upon by *attrition*, when the waves carry with them loose stones, or other moveable materials; the pure water, however violent its motion, is perfectly harmless.

We now pass the Bush at *Bushmills*, to examine the *Giant's Causeway* and the magnificent promontory of *Bengore*, of which it forms a most diminutive part.

The attention of the naturalist was long limited to this single spot; when, some forty years ago, the Earl of Bristol, returning from the continent, enthusiastic on the subject of Mr. Desmarest's supposed discovery, that prismatic and columnar basalt were *volcanic* productions, and once fluid lava, perhaps too not aware, that Mr. Desmarest had invented this theory for the sole purpose of impeaching the chronology of Moses, his lordship was very active in exploring our coast, and added the magnificent façades of *Bengore* to the curious, but scanty stock we then possessed.

Ten or twelve years ago, I took up the natural history of the basaltic coast of *Antrim* as a sort
of

of department, and added much to the list of its wonderful productions.

The *whyn-dykes* of Bengore are all of *my* discovery.

It also escaped my predecessors, that this promontory was a fabric of consummate regularity; a complete *whole*, with every part found in its proper place, so soon as the original plan of arrangement is understood; and that plan, with the subsequent operations of nature, better displayed *here* than, perhaps, on any other spot in the world.

These three objects, the *prismatic* and *columnar* construction, the *whyn-dykes*, and the *arrangement* of the strata, I shall consider distinctly for the sake of clearness, though all blended together in the same promontory.

Of the *columnar* and *prismatic* basalt so much has been already written, that I shall confine myself to *new* matter.

Crystallization, has been supposed the process, by which basalt prisms have assumed their regular forms. Mr. *Kirxan* combats this opinion; I shall add a new argument, deduced from a circumstance, belonging to perfect pillars, little attended to.

From the angles of each correct prism triangular
1
pyramids,

pyramids, terminating in sharp points, arise, embracing the corresponding angle of the incumbent prism sloped away to receive it; but the surface of this section is curved; hence, every perfect joint of a pillar has twice as many curve surfaces as it has plain sides, exclusive of the two spherical segments of its bases.

But *Abbé Hauy* has proved, that crystals are formed by the accumulation of planes; hence, in a crystal so formed curve surfaces cannot be found.

Careless writers have said, that the cavity, or socket of the joints, always opens upwards, while the convexity of the corresponding prism, that fits into it, points downwards.

But this is a misrepresentation of the fact, brought forward to support some favourite opinion on the formation of these curious joints; for, the concavity and convexity point upwards *indifferently*, and we often meet with loose joints, both ends of which are concave, and of others both convex.

The surface of the Giant's Causeway has been aptly enough compared to an honeycomb; the polygons of each, the bases of prisms completely filling both spaces.

Yet

Yet there is a difference; the *bee*, as if knowing that the three angles of a *hexagon* fill space, forms his comb of regular hexagonal prisms.

In the construction of the Giant's Causeway, the limitation is laid aside, and the general principle adopted, that, where the converging angles make exactly four right ones, space is filled.

Hence, though the prisms of the Giant's Causeway be not limited to the hexagonal, or to any figure, and though their angles vary in magnitude, yet by making the unequal angles, meeting in a point, amount to 360 degrees, the space is completely filled, as appears by the hollows on the surface holding water.

It has been said, and for the purpose of supporting system, that, where basaltic strata are horizontal, the pillars are vertical, but, where the strata are inclined, the pillars bear from the perpendicular.

Perhaps it *ought* to be so; but in the façades of *Bengore*, where the strata are inclined to the horizon, the pillars are vertical, so that we measure their height by a plumb line.

Our basaltic columns so vary from each other in neatness of execution, as to pass, *per gradus*, from the high finishing of some of the *Bengore* strata, and *Craigahuller*, until they become quite
amorphous

amorphous; yet the same stratum generally preserves nearly the same degree of perfection or imperfection through its whole extent.

And what appears singular, contiguous strata, passing into each other *per saltum*, and without interrupting the continuity of the material, differ totally in the perfection of their pillars.

Thus the beautiful range, holding the upper place at *Pleskin*, wherever room is left for another stratum, on the northern face, and through the bay of Portmoon, always passes into a stratum of rude, massive, and short pillars, so ill executed as to be sometimes nearly amorphous.

Fossils may *graduate* into each other in the cabinet of the naturalist; but in *Antrim* every change of material, every alteration, whether in the assumed form, or in the stone itself, passing into another of a different species, the change is always *per saltum*, and never *per gradus*.

Whyn-dykes.

On the subject of these curious walls, which have obtained in *Scotland* the name of *dykes* from serving often as fences, and from their material, that of *whyn*, the Gaelic name for basalt, I published a memoir in the Transactions of the Royal Irish Academy,

Academy, addressed to my friend the *bishop of Down*.

I must refer the stranger to that memoir, not to occupy too much of your survey, and shall limit myself here to such facts as had escaped me *then*, and to such others as subsequent researches have discovered.

Antrim seems the native country of *whyn-dykes*; its whole coast from *Partrush* to *Belfast* being crossed by them, while there are very few in *Down*, and I know of but one in *Armagh*, and one in *Derry*, two or three miles east from *Newtown Linavady*; it crosses the little river *Curley*, and is known by the name of *Lady Cahan's bridge*.

In the *Hebrides*, and in the *Orkneys*, *whyn-dykes* are common; and since the publication of the memoir I mention I have received accounts of them from different parts of the world, where they were not suspected to exist.

Your son, Captain *Dubpurdieu*, sent us home an account of many he saw in the *Western Islands*. *St. Helena* is full of *whyn-dykes*, of terrific grandeur; and I was much amused at receiving from the southern part of the United States a description of *the remnant of a mighty wall, built of long prismatic stones, laid horizontally, and which was of vast continuity*; no doubt a *whyn-dyke*.

As

As these unaccountable productions of nature have excited of late much attention, the stranger will, probably, be glad to be told where he is to find them. I shall therefore point out a few of those in the vicinity of the Giant's Causeway, that he may not be led out of his way; selecting such as afford me an opportunity of explaining the singular construction of these gigantic walls.

I suppose the stranger again at *Bushmills*, and advise him, if the weather permits, to secure a boat to await him at *Ballinray* or *Port na Baw*, the safest boat-harbours on that wild coast.

Should the weather be favourable, he will thus have an opportunity of viewing our magnificent colonnades *ex facie*, and to infinitely more advantage, than by peeping from the summits of the projecting points at the opposite sides of our great amphitheatres.

As the roughness of our sea too often deprives us of this advantage, I shall limit myself to places accessible by land.

I advise him to proceed first to *Port Coan*, where he may amuse himself examining a magnificent cave, accessible by land on its west side, and which opens also through the rock with much grandeur to the north, where at all times of the tide a boat can row into it a considerable way.

But





View of PORT COOAN DIKE with the Fragment of the ROCK to which it adheres

**Round Stones of Concentric Spheres of which Port Coean Cave is formed.*

But the real object of curiosity in this little bay is the solitary pyramidical rock, of which you took so accurate a view. [See plate.]

The bold elevated mass is stratified basalt like the rest of the coast; while the ruins of a beautiful whyn-dyke are attached to its eastern side, separated into three or four distinct walls, exhibiting their construction, by horizontal prisms, in a more marked manner than any other dyke on our coast.

On the eastern side of the bold rocky promontory, perforated by the cave, are the remains of another dyke, forming the side of the little boat-harbour at *Port na Baw*.

These two dykes are very instructive, and happily more instructive than any others, and exactly on a convenient rout to the Giant's Causeway.

The singular construction of whyn-dykes was first noticed by myself, and here I have a good opportunity of explaining it.

Most of our dykes are built of horizontal prisms, divisible into smaller prisms also horizontal.

I must distinguish between these two, and, conceiving I have a right to make language subservient to the purposes of science, I call the greater (that is, the stones, which the mason would have laid, had he been the builder) *component prisms*,
and

and the smaller, into which these break, *constituent prisms*.

Now, the neatness of these two descriptions of prisms is very different in different dykes, as in the two now under our eye; for the component prisms of the *Port Coan* dyke are singularly neat, while the *constituent* are very imperfect; but the contrary happens in the *Port na Baw* dyke; and the same character is preserved in each, where they both cut into the face of the steep, one hundred yards to the southward.

I cannot omit this opportunity of noticing some curious differences in the internal construction of some varieties of basalt.

Columnar and *prismatic* basalt has but one principle of construction, the external vitible form, which we admire so much; break the neatest prism, the fracture is conchoidal, no trace of further regularity.

The basalt of whyn-dykes has, as I have just stated, a double principle of construction, the visible *component*, and internal *constituent*.

But the huge prisms of the *Portrush* fine basalt, with marine exuvia, break into somewhat smaller, these into smaller still, and so on until the ultimate prisms are often not the fourth of an inch in diameter.

In

In all the gradations in the two last varieties of basalt, the internal prismatic form is *original*, shewing a striking difference between the plain brown side of the prism, and the irregular blue fracture.

We now proceed to the *Giant's Causeway*, which is cut through by *two* dykes, the first a small one, which shews itself in but two spots, cutting down from the top of the precipice, then lost, and then appearing again below among the prisms, giving an opportunity to the curious of discussing the question, whether the dyke, or the assemblage of prisms, was first formed.

The second dyke is seen in but one point, the place where the causeway seems to issue from the foot of the precipice.

It is astonishing, how, in so critical and accessible a spot, this dyke should have escaped the attention of so many, who have given descriptions of the *Giant's Causeway*.

This dyke seems to have but one principle of construction, breaking into small prisms exactly similar to the constituent prisms of the *Port na Baw* dyke.

In the bay called *Port Noffer*, bounded by the *Giant's Causeway* on the west side, three whyn-

dykes cut down through the precipice from its summit, and run into the sea across the beach.

Here, for the first time, an opportunity is offered of examining the surface of these dykes, as they are on a level with the beach.

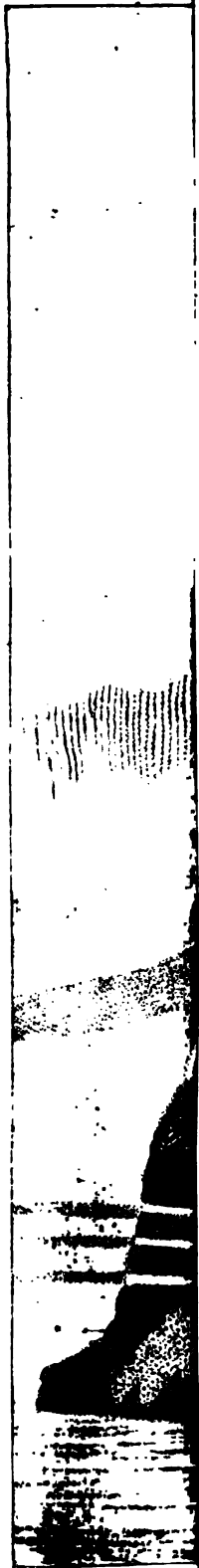
I should be led too far, if I went into their particularities, for no two dykes exactly resemble each other; one of these has a *revêtement*, that is, an outside lining of a different basalt, like some of the dykes in Belfast lough.

I give a small view of the next dyke, at *Ro-vinvalley*, which makes the eastern point of the crescent, of which the Giant's Causeway forms the western.

This dyke (as we see) cuts down from the summit of the precipice to the water, about three hundred and twenty feet. It is accessible only from the sea, and we there perceive it of continuous solidity with the main rock, through which it pursues its vertical course.

After plunging into very deep water, the dyke rises again some twenty yards from the precipice, like a little rocky islet, and shews (as is seen in the drawing) the construction to be of horizontal prisms, like other dykes.

The next dyke is in the contiguous bay, called *Port na Spagna*, from being the place where one
of



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of the Spanish Armada was wrecked. This dyke (about twelve feet broad) cuts down from the summit of the precipice, and about one hundred and eighty feet (so long as the façade is perpendicular) its horizontal prisms are contrasted with the vertical pillars of the strata it cuts through.

This dyke is lost under the rubble at the foot of the façade, but again resumed on the beach, and runs into the sea like one of the little quays made for the accommodation of ferry boats.

The component prisms of this dyke are unusually large, four or five feet in diameter, while the constituent are of the common size, about an inch; the hardness is extreme where washed by the sea, and we should in vain have attempted to break the stone, even with a great sledge, had we not fortunately the aid of a gentleman, whom my friend *Monsieur Pütet*, in his tour, calls *un amateur robuste*.

I mention this fact, only to shew the different cohesions of the parts of the same stones, when acted upon by *air*, and by *water*; for at the top of the precipice the *cicerones* will, when desired, bring an handful of loose constituent prisms from the top of the same dyke.

The last dyke I shall mention is not in this course, but near the beautiful villa of *Seaport*.

It

It is oblique and undulating (as appears in the vignette*) yet cuts through horizontal strata, which (as sometimes happens at dykes) have sunk about four feet lower on the eastern than on the western side.

I bring attention upon this dyke, as exhibiting a fact, that must be highly embarrassing to cosmogonists; horizontal strata, crossed obliquely by a solid dyke.

They have to tell us, whether this dyke be prior or posterior to the strata it cuts through.

In the former case, a solid wall, leaning so obliquely, must have fallen by its own weight.

In the latter, if a chasm, to be afterwards filled up, the contiguous unsupported strata must have closed upon it.

Nor could the dyke and the strata well have been formed together; different varieties of basalt, and the interior of the dyke differing from its edges, which are of much finer basalt, forming itself into little prisms, or rather pyramids.

When, then, was this dyke made? I can give no other answer than that of Cicero: *Omnibus fere in rebus, maxime autem in physicis, quid non sit, quam quid sit, facilius dixerim.*

A curious

* See above, Letter II.

A curious circumstance, attending *whyn-dykes*, had escaped me when I first published on their subject; they pass from the greatest to the most diminutive size by gradation.

The dyke at *Gartness* in Scotland is twenty-four yards broad.

The dyke to the westward of *Belfast*, the principal quarry from which that great and increasing town is supplied with stones for building, must be at least ten yards.

The dyke at *Ballycastle*, called the *great gaw*, is very wide; those more to the westward run from twelve to ten, eight, and six feet.

The dyke at the head of the *Giant's Causeway*, where fairly opened, is near twenty feet, while the smaller, near it, is scarcely three.

The dyke at *Portrush*, discovered by *Dr. Hope*, is but sixteen or seventeen inches; and a very curious one, with most diminutive prisms, on the top of *Fair-head*, just above *Murloch*, about thirteen.

A very singular dyke, or vein, at the little *Horse-shoe* harbour, under *Pleskin*, scarcely passes three inches; yet, in that small breadth, it is composed of different materials, the middle part *red jasper*, while the sides are basalt, much finer than the strata they cut through.

My

My friend, Dr. *Davy*, carried a specimen from this dyke to the museum of the Royal Institution.

The eastern part of the *Skerrie islands* abounds with those of different sizes, still smaller; and at the commencement of the rocks, as we approach *Portrush* from *Dunluce* strand, we have two, one an inch and an half, the other half an inch broad.

That these diminutive veins are of the same nature with the great dykes, I infer from the following reasons.

The longitudinal divisions, common in the great dykes, are found often in the smaller, even when not more than an inch in diameter.

Both great and small are of finer-grained basalt than that they cut through.

The very smallest (for instance, the half-inch vein at *Portrush*) shew a tendency to prismatic construction, different from the amorphous basalt in contact.

If complained of for the unreasonable length, to which this topic has led me, I say, in my justification, that *whyn-dykes* are an *Antrim* production, which nature has been pleased to scatter over our county, with greater profusion, and greater variety, than is to be met with in any other part of the world.

In

In the *Philosophical Transactions*, for the year 1808, I have given a minute account of the arrangement of the strata, of which *Bengore* promontory is formed, with the subsequent operations, which they shew have been performed on them, and the strange conclusions, that necessarily follow from these *facts*.

I shall now endeavour to contract the subject into a compass admissible into a statistical survey, and then shall point out the leading *facts* to the notice of the stranger, that from *these* he may judge of the validity of my inferences, and, perhaps, be able to form new ones of his own.

The promontory once *certainly* consisted of *sixteen* strata, and, *probably*, of many more; of the sixteen we can establish, by irresistible evidence, the loss of the upper *six*, which now do not reach to the grand façade, having been abrupted, and carried off at different distances from the precipice.

The ten strata we have left, and the parts that still remain of the six, all ascend to the N. N. E., their planes making with the horizon an angle of about seven degrees; of course, as the promontory advances into the sea due north, its strata ascend,
and

and when, turning our faces southward, we trace them along the retiring side of the promontory, they dip, and finally *immerge* beneath the sea; or, which is the same thing, if we trace them in a northerly direction, they *emerge*, and ascend, until six are cut off successively before they reach the precipice; and the remainder are there cut off *at once*, and form the magnificent façade.

To explain all this, I shall suppose the spectator placed in a boat, at such a distance from the middle point of the promontory, in a N. N. E. direction, as will enable him to include in his view the *Giant's Causeway*, and the rocks a little east from the old castle of *Dunseverick*, the extreme points of this little system, as nature, beyond these points, changes her stile of construction, forming new systems, varying both her materials and their arrangement.

In the Transactions of the *Royal Irish Academy*, for the year 1806, I have given a detailed account of the several systems, of which the northern coast of *Antrim* is composed from *Portrush* to *Miarloch*; nature here, as I believe over the world, forming her grand *whole* by the accumulation of a number of diminutive parts (which
I call

I call systems) exhibiting a motley patchwork; a detail of these several parts, or *systems*, forms the geological history of every country.*

Having

* I here subjoin an extract from the Memoir above-mentioned.

" I shall proceed to give a short account of the materials and arrangement of the strata in an extent of about sixteen miles along our northern coast, where they are most happily displayed, and have not, as far as I can find, been examined by any naturalist.

I begin at *Murlogh*, four miles east from Ballycastle. Here the precipice is composed of alternate strata of *freestone* and *coal*, inserted between mighty strata of columnar basalt; the contiguous northern face of *Fairhead* consists of vast basalt pillars, 250 feet long each, its N. W. side alternate strata of *freestone* and *coal*.

The precipice is interrupted a little at Ballycastle, and immediately resumed on its west side; a stratum of *white limestone* forms the base, and is covered by successive strata of *tabular basalts*; the limestone soon disappears, and is resumed again at *Kenbaan* with alternate strata of *basalt* and *limestone* (sometimes mixed) over it; the covering of the limestone stratum now changes to an alternation of great strata of columnar basalt, and a red ochrous substance, no doubt, decomposed basalt.

At *Carrickarede*, this arrangement is changed into a solid unstratified mass of *columnar basalt*, 250 feet high, the alternate mass I have passed being about 400; above this, the hill or mountain of *Knock-soghy* is composed of strata of columnar basalt, alternately with another species of basalt (hitherto unnoticed, though common with us) of the same grain, but of quite different internal construction.

The coast now lowers for a few miles to the castle of *Dunseverick*, near which the bold promontory of *Bengore* projects into the ocean, displaying with great magnificence the various strata, of which it is composed.

Having placed the spectator in a station, whence he may view the whole façade of *Bengore* in front, the first circumstance, that probably will attract his notice, will be the regular ascent of all the strata from the places, where they respectively *emerge* from the sea, until they *culminate* in the middle point of the promontory.

Or, should he chuse to commence with the point right opposite to him, where the strata have attained their greatest height, he will find them regularly dipping on both sides until they sink successively beneath the surface of the water.

The spectator will probably next take notice of the irregular curve line, bounding the surface of the façade. He will perceive, that the positions of the strata are not affected by this irregularity; that the hollows are formed by indentures of different depths, cut down into the steady mass of the strata; and that the more elevated parts are formed by the accumulation of portions of new strata, with their planes steadily parallel to all the rest.

Hoping

For many miles westward, the face of the rock is composed of strata of table basalt, separated from each other by ochrous layers; this arrangement is interrupted at *Dunluce*, for about a mile, by a precipice of stratified white limestone, near 150 feet high."

Transactions of the Royal Irish Academy for 1806.

Hoping your limits will permit, I shall, as briefly as possible, run over the several strata composing this wonderful promontory. They will be found to furnish irresistible proof of the position I have laid down, to wit, that immense quantities of materials have been carried off from our surface without the slightest disturbance of what is left.

Six Bengore strata, that are removed.

Let the spectator now direct his eye to the façade east from the castle of *Dunseverick*; it is composed of rude columns, about sixty feet high.

This colonnade, with a much smaller red ochrous stratum beneath it, passes westward horizontally, scarcely above the level of the sea, until they reach the angle the projecting promontory makes with the rectilineal coast; the two strata there begin to ascend obliquely along the façade, and in a quarter of a mile the great columnar one has reached the summit, which it occupies at the full length of its pillars, in the little bay next to *Portmoon*.

When this first stratum reaches *Portmoon*, it has lost part; its pillars are shortened, its surface slopes away irregularly until, in the south-west corner

corner of Portmoon, it and the little ochrous stratum below it vanish entirely, and are seen no more; when vanishing, the lower surface of these strata is two hundred feet high.

The *third* stratum is of the description I call *irregular prismatic*; it is about sixty feet thick; its upper surface runs between high and low-water mark, until it reaches the angle of the promontory, where it emerges entirely, ascends along the façade like the two above it; when they vanish, it becomes for a short space the surface stratum, and soon vanishes entirely also, its base still rectilineal, while its surface (the part acted upon) is scalloped away.

Though this stratum be sixty feet thick, only a few feet of its lower edge are ever seen again.

The *fourth* stratum is columnar, the pillars seven feet long, and not neat, though small.

The *fifth* stratum, about eight feet thick, is ochrous.

The *sixth* is formed of coarse rude pillars, about ten feet long.

The *emersion* of these three strata I had long sought for; at length, two years ago, the *Earl of Selkirk* discovered them in their proper place, a little south-east from *Portmoon*.

The spectator will trace these three strata ascending

ing together along the façade, until they reach the surface near the cascade in the N. W. corner of Portmoon; there they vanish in the air, and are lost for a long time.

The *arrangement, ascent, and disappearance*, at the surface of these six strata, are happily displayed at *Portmoon*, the most instructive spot on our coast, and viewed to great advantage from the easternmost point of the bay on the north side of the cascade; this point (on the top of the precipice) is always accessible, and so happily situated as to relieve the land traveller from the necessity of descending the steep.

The *fourth, fifth, and sixth* strata, thus vanishing here; are seen no more for one mile, when at a very critical point they then appear on the top of the façade, in the same order, and with the same characteristic marks they exhibited at *Portmoon*.

From this point (looking westward) they are seen frequently, one, two, or all of them (and sometimes a stripe of the third stratum crowning them) appearing in a desultory way until we reach the point above the causeway, where the system changes, and a new arrangement takes place quite different from the former.

Bengore

Bengore strata, that remain.

I have now arrived at the permanent strata, whose perpendicular section gives the superb façades of Bengore at present.

The *seventh* is composed of very neat pillars, 54 feet long each; it forms the upper range at Pleskin, and exhibits the most beautiful colonnades we have.

Though I call this stratum *permanent*, it suffers a partial diminution at the extreme northern point of the promontory, where it is lost for a quarter of a mile.

This *seventh* stratum emerges just beyond Portmoon, ascends along the face of the precipice, until it reaches a beautiful *convex* façade near the northern point, where its upper surface is 364 feet high; there it is carried away, and again resumed at *Pleskin* at about six feet higher, and is lost no more.

Hence it gradually sinks until it reaches the hill above the Causeway, where the system terminates.

The *eighth* stratum is *irregular prismatic*, fifty-four feet thick; it emerges at the S. E. point at Portmoon, where we find it half above, half under

der the water; this stratum ascends, culminates, and dips, like those above it, and reaches its termination some thirty feet above the Giant's Causeway.

The reader will probably be impatient to know something of the *Giant's Causeway* itself, and to be told what part it bears in this grand whole.

A most insignificant one, it being merely the intersection of the plane of the *ninth* stratum (at which we are now arrived) with the plane of the sea.

This *ninth* stratum is composed of very neat pillars, of (where the stratum attains its full breadth) forty-four feet long; it emerges rather within Portmoon, where its surface forms the bases of the two islands *Beanyn Duana*; it soon ascends, like the others, along the façade, displaying nice colonnades (wherever the perpendicularity of the precipice discloses them) culminates at the northern point, where the colonnade above it is lost; the bases of its pillars are there 240 feet above the sea.

Tracing it westward, it dips like those above it; at length it reaches the sea, at the Giant's Causeway, where the surface is laid bare at its *immersion*.

At

At the two intersections of this stratum with the plane of the sea (both accessible by water) the prisms and pillars are precisely similar; the intermediate *arch* two miles in span, its greatest elevation 280 feet.

The *tenth* stratum, upon which that which forms the Giant's Causeway rests, is ochrous.

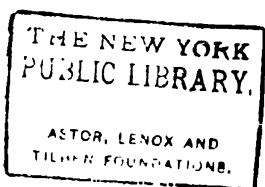
This stratum makes a conspicuous appearance along the whole face of the promontory, being as red as brick.

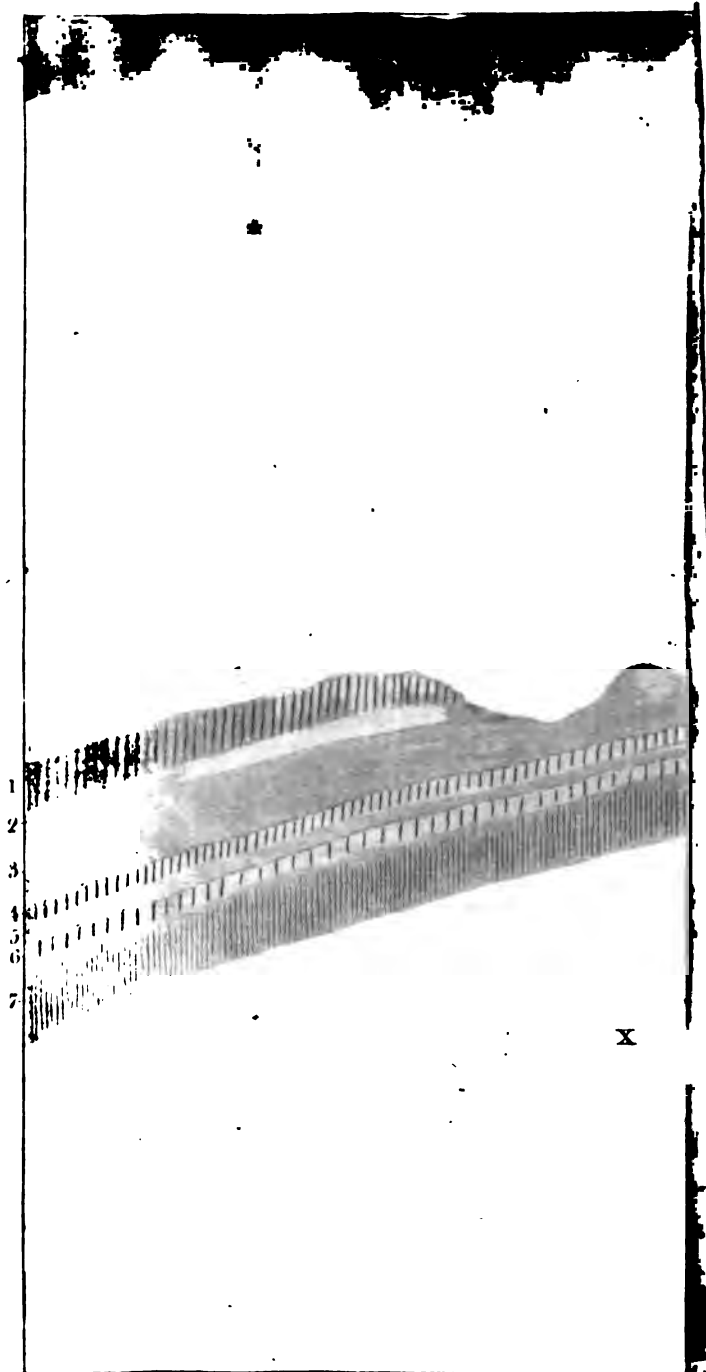
Both the *immersion* and *emersion* of this stratum are lost, for want of perpendicularity to disclose them.

The remaining *six* strata are all of the same description, *tabular basalt*; they *emerge* successively in the northern part of Portmoon, and *immerge* together on the opposite side of the bay from the Giant's Causeway, whence we have a full and last view of them.

Explanation of the drawing, illustrating the arrangement of the basaltic strata at PLESKIN and PORTMOON façades.

My ingenious friend, the Rev. John Young, has been so good as to execute the above drawing for me,





me, which, I hope, will make this interesting subject intelligible to those, who have not an opportunity of examining the curious arrangement of the strata at the Giant's Causeway, and the more extraordinary circumstance of the occasional interruptions of some of them, and the entire removal of others.

The left compartment exhibits the perpendicular façade at *Portmoon*, with its seven strata, and shews how most of them vanish when they reach the surface.

The right-hand compartment shews a portion of the façade at *Pleskin*, where all the strata culminate, and where ten of them are displayed in great beauty.

Mr. Young assumes the interval between *Portmoon* and *Pleskin* to be reduced to a mathematical line | and the *Portmoon* strata to pass immediately into the *Pleskin* strata, *without* an interval, as we know they do through the intermediate space, perhaps half a mile.

X A magnificent colonnade forms the seventh stratum, the only one exhibited by nature in *both* façades.

Mr. Young makes this seventh pass, without interruption, from one façade to the other, as undoubtedly

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doubtedly it once did; the six strata *above* this, at Portmoon, are those, which have been carried off from Pleskin by the grand operation of nature I have dwelled on so much.

Of the nine strata below this at Pleskin, if sought for at Portmoon, some of them would be found under the rubble at the foot of the façade, but more of them under the sea, previous to their emersion.

These nine if laid bare, so as to be exhibited here, would occupy the space (X) left a blank in the Portmoon compartment.

Eastern Tract.

Having finished the promontory of *Bengore*, we proceed eastward by the coast, which is all beautiful, but I do not know of any thing remarkable between *Dunseverick* and *Ballintoy*.

I advise the stranger by all means to send forward, and engage a boat to be in waiting for him at *Ballintoy*, that he may enjoy the highly diversified scenery and the fine façades the coast exhibits, as he passes along it to *Ballycastle*.

The rocky island of *Carrickarede*, with the contiguous part of the main, affords the only instance I know, on our coast, of *unstratified* columnar basalt.

Here

Here we have a most beautiful cave, about thirty feet high, formed, as it were, by the removal of the lower portion of each pillar, while the upper part of the shaft, emerging a few feet from the solid mass in which it is inserted, exhibits its unsupported polygonal base.

I know not any point on our coast, in which the position I have laid down, that columnar basalt is originally one solid mass, is better established than at this cave, into which we can row a considerable way, perhaps not without some dread of the impending columns, not seeing what prevents them from falling and crushing us.

The dreadful chasm between the island and the main, across which a rope bridge is stretched, and the façade on the east side, changing from a solid mass to an alternation of columnar and ochreous basalt, 350 feet high; beyond that the re-appearing white limestone façades exhibit, from the front of the cave, one of the grandest scenes we have.

Proceeding eastward, near *Kenbaun* the irregular prominences, standing erect between the foot of the precipice and the sea, are bolder, as well as sharper, than those below *Bengore*, which I have mentioned; and, like them, not ruins that have fallen from above, but detached parts of the original rock, standing now where they had been
formed,

formed, as appears by their stratification corresponding with that of the original façade.

Kenbaan itself is a delightful little peninsula, selected, like *Dunlúce*, from the narrowness of its approach and consequent solidity of defence; the last possessors of this strong post, where the ruins of a gateway remain, were the *McAlisters*, I presume, early Scotch invaders.

There is something irregular in the precipice above as to the arrangement of the limestone and basalt, which are more mixed here than on any other part of our coast, affording numerous opportunities of examining the junctions of the basalt and limestone, which always pass into each other *per saltum*, without interrupting the solidity of the whole mass.

The row along the coast continues its beauty all the way to *Ballycastle*, which I advise the stranger to consider as a *station*, whence he may make *three* very interesting expeditions.

Rathlin.

The first to the island of *Rathlin* (still *Antrim*) where the arrangement of the materials and disposition of the strata are more decidedly marked than on the main.

This

This island seems to have come fresher from the hand of nature than the rest of the county, and its strata to be less deranged from their original horizontal positions; for we see the limestone crossing the centre of the island, without rising much above the level of the sea on either side.

I strongly recommend to the admirers of magnificent scenery, to coast the northern face of the island. The precipices, and particularly about *Ken Truan*, are more terrific than any others on our coast, 450 feet high; and without a projecting base here, as on the shore of the main, they immerge at *Ken Truan* at once into deep water.

Fair-head.

The next expedition I recommend the stranger to undertake, is to coast round *Fair-head* to *Murlogh*, thence to return by land to *Ballycastle*.

I am satisfied the columnar range of *Fair-head* is by far the most magnificent basaltic façade yet discovered, its pillars of a length far exceeding any, of which we have an authentic account, no less than 250 feet each.

These gigantic columns are of curious construction, each of them formed by an accumulation of smaller

smaller pillars, resembling in some sort the Gothic pillars in our cathedrals; but with the *Fair-head* columns this construction is not merely apparent and superficial; for, when broken across, the section exhibits the polygonal bases of the component pillars; this fact, I understand, is *unique* in natural history.

The tides on this coast run very rapidly, so that it would be vain to attempt to stem them; and the ebb returning to the westward, and meeting the heavy swell setting in from the ocean, makes so sharp a sea as to be highly dangerous.

This, however, is easily avoided: set out from *Ballycastle* with the flood-tide, row along the coast, enjoying the stupendous scenery; then land at *Murlogh*; returning home by the summit at the precipice, until you reach the path leading down to the *collieries*, which there will be full time to examine, the coasting part of the expedition being soon executed by the aid of the rapid tide.

Knocklaid.

The third excursion I recommend to the stranger, from his station at *Ballycastle*, is the tour of *Knocklaid*.

He

He will find a good road up the valley of *Glen-shesk*; there, for the first time, he will find himself in a schistose country, and, where a breach or opening affords opportunity, he may trace the mode, in which nature has been pleased to arrange this fossil, so different from that, in which she disposes basalt and limestone, the only fossils he has yet met with.

The *schistus*, in angles rarely varying much from 60 degrees, while *basalt* generally makes angle with the horizon, running from seven to ten degrees; *limestone* very little more, and the *freestone* strata at the collieries pretty much the same.

This fact must be very embarrassing to *cosmogonists*, whose strata are all acted upon in the same manner, and arranged under the general operations used by each separate *world-maker*.

How then can a difference of material produce such a decided difference of arrangement?

That the fact is so, every mineralogist knows; the tour through *Glen-shesk* will establish it here; and, that the disposition of *schistus* strata is the same all over *Spain*, I again appeal to *Townsend's Travels* in that country.

At the head of *Glen-hesk* the road (for there is a good one) turns to the west, and leads through the
glyn

glyn between *Knocklaid* and *Bohul Bregagh* to *Ardmoy*.

Within a quarter of a mile of this village we begin to perceive basalt appearing among the field stones, and we soon find ourselves again in the basaltic area; but the *actual* line of demarcation, on a change of material, is rarely discoverable.

When opposite to *Bohul Bregagh*, we see on the mountain above us stratified sandstone, and through the whole circuit we have *Knocklaid* on our right hand, displaying in strong characters the arrangement of its materials to be as I have stated, with the circular section of the great limestone stratum (marked by its quarries) and stretching (if continued) far above our heads.

Bogs.

In the upper part of this tour round *Knocklaid* we pass through much bog, situated very high; and, as we return from *Ardmoy* to *Ballycastle*, we pass close to the eastern edge of a great bog, called *Macses bog*.

I have been told, that in the north-eastern part of Antrim two-thirds of the surface is covered with peat bog, generally called *flow bog*; great tracts of bog are also dispersed over the rest of the

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the county ; its statistical survey, therefore, may with great propriety contain some observations on the subject of peat bogs, a question at present much agitated, and, as appears, important to Antrim, whose bogs, in the very tour we are taking, will be found to throw considerable light on the subject.

That the surfaces of all peat bogs are, through much of the year, saturated with water, so as to render them unfit for the purposes of vegetation, is an admitted fact.

How then is this mischievous water to be discharged ? Are we to encounter our great bog, like the morasses in flat countries, by deep-cut emssairia on a large scale ?

Or, are we, by a slight scarification of the surface, to carry off just so much of the water as is injurious, carefully preserving what is requisite for the purposes of vegetation ?

To answer these questions satisfactorily, we have only to look to that part of Antrim we have just passed through, and the great flows to the west, all situated on high ground, and all freely discharging their own waters.

Nature seems to have treated us with more kindness than she has done the inhabitants of low flat

N

countries,

countries, upon whom she has left the *whole* task of freeing themselves from their redundant waters.

While through all our Antrim bogs she has made her own *emissaria*, brooks and little rivulets running at the bottom of gently sloping vallies, carrying off freely all the water, that either falls in rain, or rises in springs; stagnation of water in the heaviest deluges not to be met with in any one of our bogs; a fact I pointed out to my friend, Mr. Stewart, of Grace-hill, and Captain Gordon, who were so good as to accompany me in a tour through these same bogs, at the very time the lower country was inundated by floods unusually great.

Let us appeal to the bogs themselves, that we have just passed; the upper brooks, which together form the river of *Glenshesk*, run through a flow bog at the head of the glyn.

We have passed the eastern edge of *Mucses bog*, containing, probably, 1500 acres; we saw the waters on that side discharged by a little brook, running N. E. to Ballycastle, while another brook, coming down through a gently sloping valley in the centre of the bog, turns to the westward, and meets with a second little rivalet, which had collected the waters of the north-west side of the bog;

bog ; they together form the little river, which proceeds by *Grate-hill*, *Mosside*, and *Dervock* to the *Bush*.

The waters are discharged with the same facility from the still greater bog to the north of *Maces*, supposed to contain from 4000 to 5000 acres—from the *Garry* bog, containing about three thousand, and from every bog I examined in this part of Antrim.

Thus it appears, that nature has divided with us the task of draining our great bogs. As her share, she has opened the *emissaria*, leaving to man the slight trouble of carrying off the surface water by shallow drains, from ten to fifteen inches deep, and thus conducting it to the nearest brook, or rivulet, ready formed to his hand.

In this part of his business he will find he must guard more carefully against making his bogs too *dry*, than leaving them too *wet*; stopping his little cuts before the dry season comes on, to retain the necessary moisture so long as he can.

I shall here probably be told, that the diversified surface I have described is not the character, at least, of *all* our bogs; that many of them are more uniform, in which the vallies and brooks I mention are not to be found.

I admit

I admit the more general figure of our great bogs in the *interior* and south of Antrim, and of solitary great bogs in other parts of Ireland, to be a small segment of a great sphere, whose altitude bears no proportion to the diameter of its base.

The difficulty of discharging water from a surface is not much increased by making it spherical; the reclaimer has not *brooks* and *rivulets* as before, but, what answers the same purpose, he takes the water from the surface to the periphery, where, in every bog in the kingdom, he will find nature has emissaria ready for him, a facility of discharging the water from the *interior* seeming to be an indispensable condition in the original formation of a great bog; for, says a sensible Scotchman, "*were it otherwise, they would become lakes.*"

It will not be in the government of his waters the reclaimer will find his greatest trouble and weightiest expense; it will be in the preparation of his soil, and the importation of materials, to give a consistence to the superficial stratum, the matrix for his vegetables, whence they are to derive their nourishment.

As the principal ingredient in this *surface soil* must be taken from the peat moss itself, it becomes necessary to inquire what are the good qualities of
pure

pure peat, that we may avail ourselves of them, and what are its defects, that we may correct them; an inquiry certainly not misplaced in the statistical survey of a county, which contains so many thousand acres of *flow-bog*, and decidedly more than any other in the north of Ireland.

The Scotch writers, in the Transactions of their Agricultural Society, seem much disposed to condemn peat as a soil disqualified for the purposes of agriculture, and one of them particularly reprobates *peat mire*; to which I have replied (for I love contradiction) that I hold *pure peat mire* to be the richest matrix I know for a grass crop; a point I was luckily able to ascertain by experiment.

Do these gentlemen forget, that by far the greater portion of the *unreclaimed* parts of their country is *peat soil*? when they obtrude themselves upon their public, and labour to divert the agricultural spirit of Scotland, (now at so high a pitch) from the great and proper object of its exertions.

I have already measured swords in the *peat soil* cause with some of these grave *renegadoes*, and find I must again encounter another champion, whose cumbrous essays on the subject of *peat bogs* are beginning to be dispersed about my own country, disseminating with much confidence his agricultural heresies.

I have

I have elsewhere gone more at large into the discussion of Dr. Rennie's positions relative to *peat bog*; I shall here be very short; one assertion, at least, of the Doctor's requires to be refuted in a county containing so much bog as Antrim does.

This assertion is no less, than that peat soil is of *extreme sterility*; to which I reply, that peat soil is of *extreme fertility*.

Doctor Rennie has the misfortune to be a chemist, and studies agriculture in his laboratory *alone*.

There he has discovered this unhappy *peat soil* to be a mass of deleterious elements, containing every principle hostile to vegetation.

I pronounce upon the principle of peat moss, *a posteriori*; from watching the luxurious vegetation it produces, I assert it to be fertile; and, where the luxuriance abates, I search for the cause, that I may apply a remedy.

The science of cultivating peat soil may be contained in a nutshell; every thing turns upon *one* property, the *extreme looseness* or openness of the material; hence, when exposed to wet, it holds more water in saturation than is fit for the roots of vegetables growing in it.

Again, when exposed to drought, it becomes so full of *interstices*, that the roots of its vegetables are shrivelled up, and the plant stunted, or dies.

Hence

Hence the policy in the management of our water is soon learned; by frequent and shallow surface drains keep the *surface soil*, the vegetable matrix, in a proper temperature between wet and dry, and let the substratum be always saturated.

By the effect of deep drains the water is carried off from the substratum, which in dry weather ought to be the resource, whence the vegetable stratum is supplied with *moisture*; but now attacked on both surfaces, it soon becomes a dry caput mortuum, unfit for vegetable productions.

I can shew where, by complete government of the water, *pure peat soil* produces most luxuriant crops of grass; but this is *experiment*, and could not be followed in extensive practice; and it rarely happens, that we can command any waters in a dry summer.

Our resource then is, to correct the looseness of our soil, that it may be more retentive of its water, and no longer subject to the violent extremes of wet and drought I have mentioned.

This end is attained by the admixture of a *firmer* material, by which the compound (the vegetable matrix) acquires consistence, and becomes more tenacious of its moisture.

This *consolidating* material must be earthy, and of all I hold *plain clay*, well attenuated, to be the

the best; but I rely so much on the fertility of moss, that I consider the *contiguity* of this material of still more importance than its quality; for, the heavy expense of reclaiming moss consists chiefly in the importation of these materials.

Should the cost of long load-carriage induce us to use an inferior material, we must add something more *fertilizing*, and here we have an inexhaustible resource in *ashes*.

The principle of bog culture being understood, our future measures must be influenced by it.

The defect of bog soil is *looseness*; let us not increase that by our mode of treating it; every stirring opens it more, and, every time we *till* for a crop, our bog becomes less qualified to bear another, and soon wears out.

Can we not contrive to extract crops from our bog soil, without disturbing it, to let it increase by rest the *solidity* it requires?

Here, *a priori*, grass crops are pointed out to us, and theory is confirmed by experience; for, while the natural fertility of bog soil throws its crops into great luxuriance, that luxuriance is limited to *leafy* produce, the *farinaceous* always scanty, whatever be the description of grain; and I have been well assured that, where there is any
admixture

admixture of peat in the soil, *wheat* does not produce first flour.

The same principle should be attended to, when we seek manure for our peaty soils.

Lime is much used, and in great quantities ; I think, unhappily, for *lime* is very attenuating, and, though at first it may force great luxuriance, it opens and loosens the soil every year more and more.

That this is not pure *theory*, I can establish by the testimony of Mr. Hunter, of Ballymagarry, an intelligent *Antrim* agriculturist, who tells me, that the peat bogs, upon which, when first reclaiming, he laid great quantities of lime, are now returned to a most unproductive state.

The Scotch, as appears from their reports, have sometimes put 240 bushels of lime to an acre ; I recommend from 24 to 36, and always through the medium of a *compost*, where its attenuating powers will be exerted on an earthy or clayey soil, in making it more friable.

I consider pure clay, attenuated by *frost*, *labour*, a little *lime*, and stimulated by ashes, as the best compost that can be used for bog.

I must here counteract Dr. Rennie's endeavours to deter us from reclaiming our peat bogs, lest we

thereby diminish our stock of fuel, an article of the first necessity, and already in many places becoming scanty.

I lament, from Dr. Rennie's publication of his correspondence, to perceive that his alarm on this subject has made some impression, even in *Antrim*.

Had the Doctor acquired his knowledge of peat moss from nature, without limiting himself to his laboratory, he would have seen, that the improving and reclaiming our peat bogs does not in the slightest degree interfere with our future stock of fuel, which remains unimpaired, whatever the operations may be, that we execute on its surface.

The very upper stratum of our peat mosses is always loose, unfit therefore for turf, and regularly thrown aside. Will Dr. Rennie prevent the proprietor from mixing up this material (useless as fuel) with some adventitious matter, forming it into a vegetable soil, and extracting from it valuable crops, so long as it is not wanted for fuel?

When that demand comes, the proprietor throws by his surface soil until he reaches a depth, where the moss is sufficiently solid to yield *turf*; he then cuts away, carries off the turf, leaving himself a new surface some feet lower; upon this he spreads
the

the stuff from the surface he had thrown aside, and recommences his agricultural operations upon new ground.

The turf remains unaffected in quantity or quality, whether the upper surface has been reclaimed, or left in a state of nature, previous to the turf-cutting ; in each case, equally ready for use when wanted ; yet Dr. Rennie would have us condemn so much of our peat-soils to absolute sterility, from his alarm on a subject he does not understand.

I am at this moment breaking up meadows for fuel, which had been reclaimed many years ago, some by my predecessors, others by myself, without finding the turf the worse, because the upper surface has been made to yield valuable crops of hay for twenty, thirty, and forty years.

I refer the reader to Dr. Rennie's book, particularly where he discusses this topic ; he will there soon find the absolute necessity for these strictures on the Doctor's wise positions.

WM. RICHARDSON.

Clonfeck,
May 2d, 1811.

APPENDIX.

No. IV.

ADDENDA.

Preparing Ground for Corn.

SINCE the chapter on Agriculture was written, I have had an opportunity of trying a mode of preparing ground, that had borne potatoes the preceding year, for spring corn, which has been attended with complete success. The method pursued was, to *stir* the surface of the ground, without *turning* it, by means of a plough operating like a horizontal hoe. The instrument used was Manly's mole plough, that contains three hoes, which take in a space of two feet six inches, and in three bouts finish a ridge of six feet in breadth; it is made to work deep or shallow, by means of a metal wheel at the point of the beam, in which the foremost hoe is placed; the other two behind are fixed on cross pieces, which go from the beam to the handles.

The

The sketch underneath will shew the manner, in which they stand, and their shape.



A plough of this kind is in possession of the Society, and is well worth inspection.

The grain was sowed before the plough, which, from the manner of its working, shakes the seed into the openings it makes, giving it by this means a sufficient and most even covering.

To do this on a potatoe fallow, when the soil is often beaten hard by the winter rains, is sometimes difficult, and in many cases not to be done without ploughing, which is always after such preparation a hazardous trial, as is well known to all good farmers, who, rather than lose the advantage of the wintery face, trench in their grain, when the harrow will not sufficiently cover it.

This mode seems to possess several advantages; that of enabling the ground in an expeditious manner

manner to cover the seed, and of preserving the surface uppermost,* which has had the advantage of winter's exposure; and also that of destroying in a most effectual manner the weeds, which at the season of sowing are beginning to germinate, but, being cut underneath, soon cease to grow; for ground, that has been under turnips, or any other fallow crop, this or a similar preparation seems to be well adapted.

I have heard, that in different parts of England, where it is customary to plough the ground before winter, instead of giving, in spring, one or more turnings with the same implement as was formerly the case, the surface is merely *stirred* without *turning*, to give the future crop as much as possible the benefit, which the soil has received from the vicissitudes of the weather during the winter season, and that great advantage has been received from this method.

Fiorin.

* It is well known, that all cutiliferous plants throw out the crotchal roots at the period of their shooting, near the surface; when they are completed, the seminal roots, being no longer necessary, die.

Fiorin.

The Rev. Mr. Craig, near Lisburn, has been very successful in the cultivation of this grass; he planted a plot of it in the month of March 1811, which the preceding year had borne potatoes; a part of this he cut, and made into hay the same year; the produce was great, and greedily devoured by his horses; the strings were laid on the ground, and covered with a sandy earth taken out of the same field.

What remains uncut is a most luxuriant crop, the runners being from six to eight feet in length. From the succulent appearance of this part, it must certainly prove a very nutritious food in its present state, well adapted to afford a supply of green fodder in the winter season. The part, that was cut, is calculated to have produced at the rate of six tons per acre, which, allowing for the short time it has occupied the ground, must be considered as a great produce.

Sinking

Sinking of the surface of the ground.

The sinking of the basalt, in the neighbourhood of the limestone, is a curious circumstance. One instance of this kind occurred some time ago in the parish of Soldierstown, on the lands of Broom-mount, the hospitable residence of Mr. Gorman, where, on the gentle slope of a hill, a round and circular opening was formed by the sinking of the basaltic rock, followed by the soil, which opening much resembled the cone of a very large lime-kiln.

What this is owing to, cannot expressly be stated, but it is supposed to originate from the softening and carrying away of some understratum, probably limestone, by the action of subterraneous running waters, which are known to exist (as before stated) in this basaltic and limestone county.

FINIS.

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